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GONE WITH THE WATER — DRAINAGE RIGHTS AND STORM WATER MANAGEMENT IN PENNSYLVANIA

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PENNSYLVANIA IS BLESSED with abundant water resources. With an average annual precipitation of thirty to sixty inches,¹ the Commonwealth ranks among the wettest states.² Its 10.5 million acres of forest, farms, and urban areas form the watersheds of 45,000 miles of surface streams and constitute substantial drainage basins for four major interstate rivers. Annual direct runoff to surface waters averages from 4.73 to 7.09 trillion gallons,³ and another 9.45 to 11.81 trillion gallons is recharged to groundwater aquifers.⁴

Pennsylvania's bounty has, at times, also been the scourge of its citizens. Flooding has damaged human settlements from the earliest days of the colonial proprietors.⁵ Urban, industrial and commercial development, as well as clearing land for agriculture and mining, has simultaneously increased runoff and placed valuable structures and investments in the path of floodwaters. Since 1936 — just forty-one years ago — Pennsylvanians have suffered eighteen major floods, each accounting for damages in excess of \$1 million. Total damages from these eighteen floods alone amounted to more than \$5.5 billion.⁶ Although there is a tendency to look upon the great floods, such as the disasters of 1936, 1972, and 1977, as remote and

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1. A.E. BECHER, *GROUND WATER IN PENNSYLVANIA* 9 (Pa. Geol. Surv. Educ. Series No. 3, 1973).

2. *See* 1 *WATERS AND WATER RIGHTS* 21 (R.E. Clark ed. 1967) [hereinafter cited as 1 *WATER RIGHTS*].

3. *See* A.E. BECHER, *supra* note 1, at 9.

4. *See id.*

5. *See generally* W.H. SHANK, *GREAT FLOODS OF PENNSYLVANIA* (1968).

6. PA. OFFICE OF STATE PLANNING AND DEVELOPMENT, *A LAND POLICY PROGRAM FOR PENNSYLVANIA — ENVIRONMENT* 4 (1976). Preliminary damage estimates for the 1977 Johnstown flood total approximately \$200 million. Interview with John McSparran, Chief, Div. of Comprehensive Resources Programming, Pa. Dep't of Environmental Resources (Aug. 25, 1977).

unprecedented events, the fact is that serious and moderate floods are a part of the regular and natural history of the Commonwealth.

Drainage law and storm water management are matters of public, as well as private, concern. The ability of one owner to develop land, install impervious surfaces, alter drainage paths, and accelerate runoff onto other properties involves more than issues of what rights and relief should be accorded neighboring property owners. Urbanization may double or triple the peak flows of five- and ten-year floods.⁷ Lands far downstream may be severely affected by the cumulative impact of unplanned and unregulated changes in drainage patterns due to urban clearance, grading, and development. Increasingly, the costs of uncontrolled drainage modifications and storm water management have fallen on the state and federal budgets. Taxpayers of Pennsylvania and the nation have repeatedly been called upon to finance the reconstruction of communities inundated by floodwaters and the restoration of roads, utilities, and other public services. After Hurricane Agnes, for example, the Commonwealth appropriated \$290 million for flood relief;⁸ an additional \$1.5 billion was contributed by the federal government.⁹ Many millions more were lost through unemployment and tax adjustments on damaged properties and businesses. To the extent that these damages could be limited or reduced by reasonable flood plain and storm water planning and management, the public clearly has a stake in the development of rational legal and institutional approaches to these goals.

The purpose of this article is to explore the interrelated issues of drainage rights, storm water and flood control programs, and flood plain management. The first two sections of the article will explain the development of common law rules governing drainage of lands and liability to adjacent property owners. Part III discusses the past and current approaches to defining municipal responsibility for the control and management of storm water runoff from highways and urban development through storm sewer systems and regulatory controls. The relationship of state and federal flood control, water obstruction regulation, erosion reduction, and flood plain programs to storm water problems is the subject of Part IV.

7. See REGIONAL SCIENCE RESEARCH INSTITUTE, ENVIRONMENTAL STUDY OF THE WISSAHICKON WATERSHED WITHIN THE CITY OF PHILADELPHIA, pt. 1, at 72 (1973) (prepared for the City of Philadelphia); Hammer, *Stream Channel Enlargement Due to Urbanization*, 8 WATER RESOURCES RESEARCH 1530, 1534-40 (1972). See generally L.B. LEOPOLD, HYDROLOGY FOR URBAN LAND USE PLANNERS — A GUIDEBOOK ON THE HYDROLOGIC EFFECTS OF URBAN LAND USE (U.S. Geol. Surv. Circ. 554, 1968).

8. *Hearings on Senate Bill 1122 Before the Pa. Senate Environmental Resources Committee* 2 (March 7, 1974) (statement of Maurice K. Goddard) (on file with the Pa. Senate Envir. Resources Comm.).

9. *Id.*

In the context of this article, it is not possible to provide a definitive answer to each of the questions raised. Rather, the purpose is to provide a comprehensive statement of the legal and institutional background of drainage and storm water issues in order to allow an informed and thoughtful public discussion of possible legislative, regulatory, judicial, and administrative approaches to resolve these questions in a manner that will best serve Pennsylvania's citizens.

I. DEVELOPMENT OF COMMON LAW DRAINAGE RULES

A. *Common Law Classifications of Water*

Hydrologists and water resource scientists generally consider all water to be part of a unitary hydrologic cycle, irrespective of its location on the surface or underground at any point in time.¹⁰ The legal profession, on the other hand, has "coped with the complexity of water by trying to compartmentalize it."¹¹ For the purposes of drainage rights, two "natural" divisions of waters on the surface of the earth — surface waters in defined watercourses and lakes, and diffused surface waters — have been distinguished under the common law of Pennsylvania and most other American jurisdictions.¹² Different rules governing adjacent owners' rights to direct and dispose of waters have been developed for each of these classifications. Therefore, before exploring the interstices of drainage law, a clear understanding of these categories is necessary.

"Diffused surface water," often referred to as "surface water"¹³ in common law decisions, encompasses the uncollected flow from falling rain or melting snow and waters which flow from springs and diffuse over the surface of the earth.¹⁴ Diffused surface waters include all surface waters which are not contained in defined lakes, ponds, or watercourses.

The definition of "watercourse" does not follow a uniform prescription but varies in accordance with the legal context. Two distinct meanings have been discerned, one used "when referring to

10. See 1 WATER RIGHTS, *supra* note 2, § 3.1, at 16.

11. Thomas & Leopold, *Ground Water in North America*, 143 SCIENCE 1001 (1964).

12. See *Kunkle v. Ford City Borough*, 305 Pa. 416, 158 A. 159 (1931); *Kislinski v. Gilboy*, 19 Pa. Super. Ct. 453, 454-55 (1902); 5 WATERS AND WATER RIGHTS § 450.5, at 485 (R.E. Clark ed. 1972) [hereinafter cited as 5 WATER RIGHTS].

13. For the purposes of this report, the term "diffused surface water" will be used to denote water flowing over or standing upon the land surface which has not reached a defined lake or watercourse. Following the accepted hydrologic nomenclature, "surface waters" will mean all waters on the surface of the land, including streams, lakes, and diffused surface waters.

14. See 1 C. KINNEY, IRRIGATION AND WATER RIGHTS 516-19 (2d ed. 1912); 1 WATER RIGHTS, *supra* note 2, § 52.1; 56 AM. JUR. *Waters* § 65 (1947); 93 C.J.S. *Waters* §§ 112-113 (1956).

that watercourse in and to which riparian rights may attach, and the other when referring to that watercourse through which an upper landowner may discharge water from his land."¹⁵ While the courts, including those of Pennsylvania, have not always recognized or respected this distinction, it is nevertheless important in the proper application of drainage rules.

The most commonly quoted definitions of "streams" and "watercourses" are derived from cases that attempted to delineate those watercourses to which riparian rights could attach. In this context, "[t]he terms 'watercourse' or 'natural stream' refer to water flowing in a definite channel with a bed and banks or sides."¹⁶ The general elements of a watercourse are a channel, consisting of a well-defined bed and banks, a current of water, and a source, with a flow and a place of discharge usually being implied. However, too much emphasis should not be placed upon the presence of any one of these characteristics, as none of them are considered to be absolute components of a watercourse.¹⁷

This formulation of the term "watercourse" has been accepted in Pennsylvania with respect to drainage issues, as well as questions involving riparian rights. In the seminal case of *Kislinski v. Gilboy*,¹⁸ the superior court provided the following definition of a watercourse:

[A] stream of water usually flowing in a definite channel having a bed and sides, or banks, and discharging itself into some other stream or body of water Mere drainage over the general surface of land is very different from the flow of a stream or brook across the premises of another. In general the channel and banks formed by the flowing of the water must present to the eye on a casual glance, the unmistakable evidence of the frequent action of running water . . . ; but the water need not flow continually, and there are many water courses which are sometimes dry. There is, however, a distinction to be taken in law between a regular flowing stream of water, which at certain seasons is dried up, and those occasional bursts of water, which in times of freshet, or melting of ice and snow descend from the hills and inundate the country.¹⁹

15. Annot., 81 A.L.R. 262-63 (1932), quoting *Thompson v. Andrews*, 39 S.D. 477, 484, 165 N.W. 9, 11 (1917); see Annot., 40 A.L.R. 839 (1926).

16. 1 WATER RIGHTS, *supra* note 2, § 52.1(B), at 308; 93 C.J.S. *Waters* §§ 3-4 (1956); 39 P.L.E. *Waters* § 1, at 446 (1961).

17. See 93 C.J.S. *Waters* § 4(a) (1956).

18. 19 Pa. Super. Ct. 453 (1902).

19. *Id.* at 454-55 (citations omitted), quoted with approval in *Kunkle v. Ford City Borough*, 305 Pa. 416, 419-20, 158 A. 159, 160-61 (1931).

A constant flow of water is not necessary to establish the existence of a stream; flow may be periodic. Occasional surface water discharges during extraordinary rains or snow melts are not sufficient to define a watercourse. However, where a discernible channel and banks have been established over the years by a periodic flow of water, a natural watercourse will normally be found to exist.²⁰

Some drainage rights cases from other jurisdictions have recognized even more liberal watercourse definitions. In delineating a stream for purposes of drainage, as opposed to riparian water use, some courts have rejected a test requiring "definite and well-marked sides or banks." For example, in the Illinois Supreme Court's view, a watercourse would be found "[i]f the surface water in fact uniformly or habitually flows off over a given course, having reasonable limits as to width."²¹ Some courts, in deciding drainage rights cases, have found watercourses or drainage courses to exist even where grass grew in the channel and flows were only sporadic.²²

Although no Pennsylvania opinions have adopted such broad formulations, the trend of decisions in the Commonwealth has been to favor relatively liberal tests of watercourses for drainage purposes.²³

In this regard, it should be noted that watercourses need not be exclusively natural. For the purposes of classifications to determine drainage rights, it is not necessary that the flow of water be entirely from a natural source, or that the entire watercourse be contained in a natural channel.²⁴ Several Pennsylvania decisions have treated manmade ditches and artificially modified channels as "ancient watercourses" to which the drainage rules of streams apply.²⁵

20. 1 WATER RIGHTS, *supra* note 2, §52.1(b). In describing the types of periodic water flows which assume the characteristics of a natural watercourse, one commentator has remarked that: "Surface waters from rainfall, melting snows, and springs which seep, percolate, or flow over the surface of the earth lose their character of 'diffused surface waters' and become a watercourse when the flow follows a reasonably well-defined channel with banks and bed." *Id.*, citing *Hutchinson v. Watson Slough Ditch Co.*, 16 Idaho 484, 101 P. 1059 (1909), and *Gray v. Reclamation Dist. No. 1500*, 174 Cal. 622, 163 P. 1024 (1917).

21. *Lambert v. Alcorn*, 144 Ill. 313, 324, 33 N.E. 53, 56 (1893). Similarly, the Supreme Court of Minnesota has decided that if a depression is the usual and natural channel along which the surface water has been accustomed to flow, and the channel bears the marks of water having flowed through it, a watercourse exists. *Jungblum v. Minneapolis New Ulm & Southwestern R.R.*, 70 Minn. 153, 157, 72 N.W. 971, 972 (1897).

22. *See, e.g., Reichert v. Northern Pac. Ry.*, 39 N.D. 114, 167 N.W. 127 (1918).

23. *See* notes 114-127 and accompanying text *infra*.

24. *See Chowchilla Farms, Inc. v. Martin*, 219 Cal. 1, 25 P.2d 435 (1933); *San Gabriel Valley Country Club v. County of Los Angeles*, 182 Cal. 392, 188 P. 554 (1920); *Weck v. Los Angeles County Flood Control Dist.*, 80 Cal. App. 2d 182, 181 P.2d 935 (1947). *See also* 93 C.J.S. *Waters* §4(b), at 597 (1956).

25. *See Munn v. Mayor of Pittsburgh*, 40 Pa. 364 (1861) (sewer which replaced natural stream treated as stream); *Rohrer v. Harrisburg*, 20 Pa. Super. Ct. 543 (1902)

B. Introduction to Common Law Drainage Doctrines

In American jurisdictions, three basic legal doctrines have been applied to questions concerning the drainage of surface waters. These doctrines are commonly referred to as the “civil law,” “common enemy,” and “reasonable use” rules.²⁶ These three rules, their progeny and mutations, differ substantially in their origins, basic theories, and fundamental policies. Each has inherent benefits and critical flaws, at least in their pure form.

1. The Civil Law Rule

The civil law rule of drainage accords the owner of upland property the right to drain surface waters onto lower lands and correspondingly imposes upon lower owners a duty to receive surface waters from higher lands.²⁷ Thus, the civil law rule grants the owner of the higher or dominant land an easement of natural flow over the lower or servient land and prohibits a possessor of lower land from obstructing the natural flow of diffused surface water or watercourses from upper lands.²⁸ In its pure form, however, the doctrine does not recognize any right in the upper landowner to increase the burden on the lower land by accelerating the rate or enlarging the amount of runoff.²⁹ The lower owner has a right of action when the upland owner or another party interferes with natural conditions or causes water to be discharged in a greater quantity or in a different manner than would occur naturally.³⁰

The civil law doctrine is derived from Roman Law and the Napoleonic Code.³¹ Allegedly, the rule finds its basis in the “natural law” of drainage, as expressed in the maxim *aqua currit, et debet curere, ut solebat ex jure naturae* (water runs, and ought to run, as it is wont to do by natural right).³²

Like many areas of water law founded upon maxims and homilies,³³ the pure civil law rule did not prove satisfactory and has

(ditches along road, although not natural watercourses, had history of continued sanction by local authorities and were treated as natural course of water). *But see* *Lorah v. Amity Township*, 35 Pa. Super. Ct. 529 (1908).

26. See 1 WATER RIGHTS, *supra* note 2, § 52.1; Dobbins, *Surface Water Drainage*, 36 NOTRE DAME LAW. 518 (1961); Kinyon & McClure, *Interferences with Surface Waters*, 24 MINN. L. REV. 891 (1940).

27. 5 WATER RIGHTS, *supra* note 12, § 452.1; Hanks, *The Law of Water in New Jersey*, 22 RUTGERS L. REV. 621, 688 (1968).

28. Kinyon & McClure, *supra* note 26, at 894.

29. Dobbins, *supra* note 26, at 519.

30. 1 WATER RIGHTS, *supra* note 2, § 52.1(A)(2).

31. Dobbins, *supra* note 26, at 518 & n.6.

32. *Kauffman v. Griesemer*, 26 Pa. 406, 413 (1856); Dobbins, *supra* note 26, at 518 & n.2. See also 1 WATER RIGHTS, *supra* note 2, § 52.1(A), at 305.

33. For a discussion of similar maxim-oriented common law doctrines, see R. WESTON & M. GANG, *GROUND WATER LAW IN PENNSYLVANIA* (Pa. State Water Plan

been modified substantially. The claimed advantage of the civil law rule is "predictability, in that responsibility for diversion of surface waters is fixed, all things being relatively equal."³⁴ On the other hand, the rule, in pure form, arguably "tends to inhibit development and improvement of land."³⁵ The owners of lower lands who wish to develop must provide alternate means of carrying runoff from higher properties at their own expense.³⁶ The emphasis upon natural drainage puts even greater strictures upon upper landowners. Since it is virtually impossible to grade, construct, or pave land without modifying the natural quantity and paths of runoff, any development of upper land will necessarily violate the civil law prohibition of interference with natural conditions.³⁷ Thus, developers of higher lands will likely be held responsible for changes in runoff patterns.

In response to the perceived threat to unencumbered land development that was posed by strict adherence to the civil law rule, various states limited its application to rural land³⁸ or qualified the doctrine with a rule of reason requiring courts "to determine the rights of the parties with respect to the disposition of surface waters by an assessment of all relevant factors."³⁹ As applied, the rule-of-reason modification of the civil law doctrine had the following effect:

[The rule of reason] would . . . permit a landowner to obstruct the flow of surface waters across his land by altering its contour, although some harm would thereby be caused to the owner of the dominant estate, provided "all the relevant factors" indicated the owner of the servient estate behaved reasonably. Similarly, although the civil law rule prohibits a landowner from gathering surface waters and discharging them artificially in a concentrated flow, courts have permitted the owner of a dominant estate to make some alterations, even though they caused the

Water Laws and Institutional Arrangements Background Rep. No. 2, 1976), reprinted in *Law of Ground Space Water in Pennsylvania*, 81 DICK. L. REV. 11 (1976).

34. *Keys v. Romley*, 64 Cal. 2d 396, 409, 412 P.2d 529, 537, 50 Cal. Rptr. 273, 281 (1966); see Hanks, *supra* note 27, at 688.

35. Maloney & Plager, *Diffused Surface Water: Scourge or Bounty?*, 8 NAT. RESOURCES J. 72, 76 (1968).

36. Hanks, *supra* note 27, at 688. The same is true under the common enemy rule, which gives lower owners the right to divert drainage from upper lands, but gives them no recourse to recover the cost of diverting the runoff. Essentially the common enemy rule leaves every man to himself in providing adequate drainage at his own expense. See *id.* at 691. See also notes 139-151 and accompanying text *infra*.

37. See *McMahon v. Thornton*, 5 Pa. Super. Ct. 495, 502 (1897).

38. Kinyon & McClure, *supra* note 26, at 931-32. Among those states was Pennsylvania. See *Rielly v. Stephenson*, 222 Pa. 252, 70 A. 1097 (1908); *Wilson v. McCluskey*, 46 Pa. Super. Ct. 594 (1911); *McMahon v. Thornton*, 5 Pa. Super. Ct. 495, 502 (1897); *Davidson v. Sanders*, 1 Pa. Super. Ct. 432 (1896).

39. *Keys v. Romley*, 64 Cal. 2d 396, 403, 412 P.2d 529, 533, 50 Cal. Rptr. 273, 277 (1966); see Hanks, *supra* note 27, at 688.

water to flow in an unnatural manner, provided again "all the relevant factors" showed reasonable conduct.⁴⁰

Thus, at least in some states, the application of the civil law rule has become more flexible, although less predictable, due to the injection of the rule-of-reason test. Natural conditions may be modified, but the extent of liability due to alterations in drainage patterns depends upon a retrospective, case-by-case judicial assessment of many physical, hydrologic, economic, and other factors.

2. *The Common Enemy Rule*

The common enemy rule is the antithesis of the civil law doctrine. In substance, it holds that "a possessor of land has an unlimited and unrestricted legal privilege to deal with the surface water on his land as he pleases, regardless of the harm which he may thereby cause to others."⁴¹ An upper landowner may grade and develop his property and thereby accelerate and collect runoff "without being required to take into account the consequences to other landowners, who have the right to protect themselves as best they can."⁴² In its extreme form, the common enemy rule is best described as a neighborhood contest between pipes and dikes in which "breach of the peace is often inevitable."⁴³

The origins of the common enemy doctrine are shrouded in historical rhetoric. Although often termed the common law doctrine, a number of legal commentators have seriously questioned whether the common enemy rule is derived from English common law.⁴⁴

40. Hanks, *supra* 27, at 689; see Kinyon & McClure, *supra* note 26, at 904-05; notes 52-54 and accompanying text *infra*.

41. Kinyon & McClure, *supra* note 26, at 898, citing *Gannon v. Hargadon*, 92 Mass. (10 Allen) 106, 109-10 (1865); see *Keys v. Romley*, 64 Cal. 2d 396, 400, 412 P.2d 529, 531, 50 Cal. Rptr. 273, 275 (1966); *Cass v. Dicks*, 14 Wash. 75, 44 P. 113 (1896).

42. *Keys v. Romley*, 64 Cal. 2d 396, 400, 412 P.2d 529, 531, 50 Cal. Rptr. 273, 275 (1966).

43. Maloney & Plager, *supra* note 35, at 78.

44. See Dobbins, *supra* note 26, at 519; Kinyon & McClure, *supra* note 26, at 899-900; Thompson, *Surface Waters*, 23 AM. L. REV. 372, 391 (1889); Note, *Water Rights: Surface Waters: Similarity of Common Law and Civil Law*, 8 CAL. L. REV. 197, 198 (1920); Note, *Real Property: Drainage of Surface Waters*, 3 CORNELL L.Q. 313, 315 (1918); Note, *Surface Waters: The Rights of Abutting Property Owners*, 15 VA. L. REV. 288, 290 (1929); Note, *Drainage of Surface Water by Upper Landowner onto Adjoining Lower Land*, 5 WISC. L. REV. 239, 240 (1929). The term "common enemy" is apparently derived from the English rule in shore erosion cases that the sea is the common enemy. The New Jersey Supreme Court first used the term with respect to diffused surface waters, possibly as a result of a misapprehension of English cases. See *Town of Union v. Durkes*, 38 N.J.L. 21 (1875); Dobbins, *supra* note 26, at 519 & nn.11 & 12. The Texas Supreme Court has noted: "To say that surface waters . . . are a 'common enemy,' comparable to the constant ravages of the sea against its shore line, would tax the credulity of a child." *Miller v. Letzerick*, 121 Tex. 248, 260-61, 49 S.W.2d 404, 411 (1932).

Clearly, it is not universally accepted in the British Commonwealth and American common law jurisdictions.⁴⁵

Some decisions have justified the common enemy doctrine upon "a narrow and one-sided conception of the nature of land ownership."⁴⁶ Following the maxim *cujus est solum ejus est usque ad coelum et ad inferos* (he who owns the surface owns to the sky and to the depths), such opinions reason that each owner has an absolute right to complete control of his own land, a right which "cannot be interfered with or restrained by any considerations of injury to others which may be occasioned by the flow of mere surface water in consequence of the lawful appropriation of land by its owner to a particular use or mode of enjoyment."⁴⁷

Many courts have rationalized the adoption of the common enemy rule on the ground that the doctrine favors land improvement and economic expansion.⁴⁸ This public policy argument is based upon the assumption that the civil law rule discourages construction and development, but that the common enemy doctrine, by releasing developers from liability for drainage, promotes investment and construction. This assumption is open to serious question, however. There is no evidence that the civil law rule has in fact impeded urban development. The development in a number of urbanized states, such as California, which follow the civil law doctrine appears uninhibited by their drainage rules.⁴⁹ Drainage patterns, and potential liability, are only one of many factors affecting the decisions of land developers.⁵⁰

Moreover, the question of whether either rule tends to encourage or discourage development depends upon the location of the land involved. Consider the situation of three adjoining landowners, *A*, *B*, and *C*. Suppose *A* owns the highest tract, *C* the flat land, and *B* the parcel in between. *B* grades his land, paves it, and constructs a

45. Some British Commonwealth countries have adopted the civil law rule, and others the common enemy rule. Kinyon & McClure, *supra* note 26, at 901. American courts are almost equally divided between the two doctrines. *See id.* at 896-97, 902-04. *See also* 5 WATER RIGHTS, *supra* note 12, § 456.2.

46. Kinyon & McClure, *supra* note 26, at 898.

47. *Gannon v. Hargadon*, 92 Mass. (10 Allen) 106, 109-10 (1865); *See Pennsylvania Coal Co. v. Sanderson*, 113 Pa. 126, 6 A. 453 (1886), *cited in* *Strauss v. City of Allentown*, 215 Pa. 96, 98, 63 A. 1073, 1073 (1906); *Clouse v. Crow*, 68 Pa. Super. Ct. 248, 252-53 (1917). *See also* R. WESTON & M. GANG, *supra* note 33, at 2-6, 14-16, 25-33 (discussing absolute ownership maxims and *Sanderson* rationale in groundwater cases).

48. *See, e.g., Barkley v. Wilcox*, 86 N.Y. 140, 148 (1881); *Bowsky v. Speer*, 31 N.J.L. 351, 352-53 (1865). *See also* Kinyon & McClure, *supra* note 26, at 898-99 & n.36; *Hanks*, *supra* note 27, at 690-91.

49. *See Keys v. Romley*, 64 Cal. 2d 396, 406-07, 412 P.2d 529, 535, 50 Cal. Rptr. 273, 279 (1966).

50. *See Hanks*, *supra* note 27, at 691.

residential subdivision. One commentator has analyzed *B*'s alternatives as follows:

He can, under the common enemy rule, dump the surface waters which will now collect in concentrated areas and flow at increased velocity onto *C*. He saves the cost of constructing a drainage system sufficient to prevent injury to *C*. But against any savings realized by dumping surface waters onto *C*, *B* will have to offset the cost of retaining walls and other devices to protect himself against *A*. Even if *B* comes out with a net plus, *A*'s land may, by virtue of *B*'s retaining structures, be turned into a swamp, and *C*'s land may be flooded and its soil carried off. As to *A* and *C*, the common enemy rule surely does not function to encourage development. . . . A similar analysis shows that the civil law rule does not "hinder" development. Under the common enemy rule, *B* has to make certain expenditures to protect himself against unfriendly, but rule-sanctioned, acts of *A*. These expenditures will likely be no less than the cost to him, under the civil law rule, of conducting his surface water so as not to increase his easement over *C*'s tract. As for *C*, the knowledge that *B* cannot substantially alter runoff onto *C*'s property can hardly be a deterrent [to development of the flatland].⁵¹

Indeed, it should be noted that a major proportion of Pennsylvania's industrial, commercial, and residential development has occurred in the flatlands of river valleys, lands which are particularly vulnerable to increased flooding hazards engendered by accelerated runoff from suburban development higher in the watershed. The common enemy rule threatens rather than encourages these major urban land use investments. Even developers who own the crest of hills can find little solace in the common enemy doctrine when their downslope neighbors decide to build walls to shut out the drainage from above.

3. *Reasonable Use Rule*

In response to the rigid and often irrational results of the civil law and common enemy rules, many states expressly or implicitly have adopted a "rule of reason" to govern drainage cases.⁵² The rule

51. *Id.*

52. *Id.* at 688; see 5 WATER RIGHTS, *supra* note 12, § 453; Maloney & Plager, *supra* note 35, at 79-81. This drainage doctrine has been referred to as the "reasonable use" rule, a term easily confused with the property law doctrine governing the allocation and use of surface watercourses under the riparian doctrine. Hanks *supra* note 27, at 689-90. They are, however, different rules. The riparian "reasonable use" rule for

of reason recognizes that the rights of each landowner are interdependent, correlative, and valueless unless exercised with reference to each other. The guiding light of the rule is the ancient maxim of common law: "Use your own property in such manner as not to injure that of another."⁵³ In jurisdictions following this rule, three questions are fundamental to the reasonable use standard:

1. Was there a reasonable necessity for the actor to alter the drainage to make use of his land?
2. Was the alteration done in a reasonable manner? That is, was due care taken to prevent injury to another's land? Was the natural drainage pattern followed as much as possible? Is the artificial drainage system reasonably feasible?
3. Does the utility of the actor's conduct reasonably outweigh the gravity of the harm to others?⁵⁴

In applying the traditional nuisance balancing tests, the prime attribute of the rule of reason is its flexibility in the search for a fair resolution of each case. By sacrificing the absolutism of the original civil law and common enemy approaches, the rule of reason tends to encourage more careful and considerate action by individuals in the planning and execution of land developments which may affect drainage. Thus, the rule is more likely to reflect contemporary social, environmental, and economic perspectives.

C. *Early Pennsylvania Cases — The Bentz Doctrine*

In the early Pennsylvania cases, the courts were involved in an uncertain search for basic premises and principles, unable to rely upon a body of judicial precedent or substantial scientific knowledge. As subsequent litigation revealed the magnitude of the problems associated with drainage rights, the rules announced in the early

water allocations is a property law concept for apportioning a resource. *Id.* at 690. The drainage doctrine is a strong "admixture of tort law" which includes, as potential issues in controversy, questions of foreseeability, contributory negligence, comparative negligence, assumption of risks, and proximate cause. *Id.* The term "rule of reason" used in the New Jersey case of *Armstrong v. Francis Corp.*, 20 N.J. 320, 330, 120 A.2d 4, 10 (1956), seems preferable nomenclature for the drainage rule in order to avoid doctrinal confusion. For the purposes of this article, the terms "reasonable use" or "rule of reason" will refer to the drainage law doctrines based upon the reasonableness, under all the circumstances, of changes to drainage regimens.

53. 5 WATER RIGHTS, *supra* note 12, § 453.1, *citing* *Bassett v. Salisbury Mfg. Co.*, 43 N.H. 569, 577 (1862).

54. 5 WATER RIGHTS, *supra* note 12, § 453.3 (footnotes omitted); *see* *Weinberg v. Northern Alaska Dev. Corp.*, 384 P.2d 450 (Alaska 1963); *Klutey v. Commonwealth, Dep't of Highways*, 428 S.W.2d 766 (Ky. 1967); *Enderson v. Kelehan*, 226 Minn. 163, 32 N.W.2d 286 (1948); *Armstrong v. Francis Corp.*, 20 N.J. 320, 120 A.2d 4 (1956); W. PROSSER, *THE LAW OF TORTS* § 13 (4th ed. 1971); *RESTATEMENT (SECOND) OF TORTS* § 826 (Tent. Draft No. 18, 1972).

cases were found to be ineffective in dealing with drainage disputes. Consequently, the early rules have often been distinguished, modified, or abandoned in later decisions.

The first significant drainage decision was rendered by the Pennsylvania Supreme Court in 1844 in *Bentz v. Armstrong*.⁵⁵ The plaintiff, a Philadelphia landowner, asserted a right to divert the storm runoff and the flow from a spring located on his property to the land of his neighbor, the defendant.⁵⁶ The defendant placed an obstruction on his own land to throw the waters back upon the plaintiff's lot.⁵⁷ The court found that the plaintiff had not acquired an "easement" to divert the water onto the defendant's land, and, therefore, could not demand removal of the defendant's protective obstruction.⁵⁸ The result could have been rationalized under the common enemy rule,⁵⁹ but that was not the apparent basis of the decision. Although the *Bentz* court rejected the natural flow concept of the civil law rule,⁶⁰ it did not embrace the absolute ownership premise of the common enemy doctrine. The court stated:

[I]n the purchase of lots of ground laid out and sold for the purpose of building up towns or cities thereon, it has even been understood, and such has been the practice and usage too, that the natural formation of the surface will, and indeed must, necessarily undergo a change in the construction of buildings and other improvements that are designed and intended to be made. In doing this, it would seem to be right that the common benefit and convenience of the respective owners of adjoining lots should be consulted and attended to; but certainly no one ought to be restrained from improving his lot in such a manner as to make it answer the purpose for which it was laid out, sold and purchased, if practicable without overreaching upon his neighbour's lot. He ought to be permitted to form and regulate the surface of it as he pleases, either by excavating or filling up, as may be requisite to the convenient enjoyment of it; *taking care, however, not to produce any detriment or injury to his neighbour in the occupation or enjoyment of his adjoining lot.*⁶¹

In essence, the *Bentz* decision follows the common law principle *sic utere tuo ut alienum non laedas* (use your property in such a manner as not to injure that of another). The foundation of the *Bentz*

55. 8 Watts & Serg. 40 (Pa. 1844).

56. *Id.* at 41.

57. *Id.*

58. *Id.* at 41-42.

59. See notes 41-54 and accompanying text *supra*.

60. 8 Watts & Serg. at 41.

61. *Id.* at 421 (emphasis added).

rule was the concept that while landowners have the right to make reasonable improvements on their property, they are also obligated to take reasonable care to avoid injury to others.⁶²

By its own terms, the *Bentz* rule was applicable to urban drainage controversies. A dichotomy arose between urban centers and rural areas as the natural flow rule, which came to be adopted for rural drainage cases, was found impractical for developing urban lands.⁶³ Therefore, the *Bentz* doctrine led to the creation of a different principle for urban areas that allowed reasonable modification of natural conditions in the course of urban development, while imposing an obligation upon those who changed the land to provide adequate means of drainage in order to protect their neighbor.⁶⁴

The *Bentz* rule was followed in the urban drainage cases decided between 1844 and 1908. The defendant in *Young v. Leedam*,⁶⁵ like the defendant in *Bentz*, had attempted to block drainage coming from the plaintiff's higher urban land.⁶⁶ As in *Bentz*, the issue was whether the plaintiff had a right or easement to drain water naturally onto defendant's lot.⁶⁷ Although the court cited *Bentz* in absolving the defendant of liability, the question of the upper landowner's duty to provide adequate drainage so as to avoid damage to others was not directly confronted.⁶⁸ The duty of an urban property owner to connect to a drainage sewer was discussed in *Sentner v. Tees*,⁶⁹ apparently for the first time since *Bentz*. In *Sentner*, it was claimed that water accumulating on defendant's unimproved land in Philadelphia had invaded the plaintiff's cellar.⁷⁰ The court specifically limited the rule requiring the installation of

62. *Id.* In describing the bounds of what it considered to be the requisite reasonable care regarding drainage, the court stated:

It is of great importance that the water from each lot, arising from rain or other cause, should be conducted by the owner or occupier thereof, if he wishes to have it removed, directly from it to a sewer or other place appropriated for the receipt and discharge of the same, and not be turned or led on to an adjoining lot . . . ; and it appears . . . to be the duty of the owner of each lot, if he improves it, to do it in such way, if practicable, as to lead and conduct the water that happens to fall upon it, off in the way mentioned.

Id.

63. See notes 27-40 and accompanying text *supra*; notes 79-102 and accompanying text *infra*.

64. The *Bentz* rule is remarkably similar to the so-called modern "reasonable use rule," which was later developed largely as a response to the perceived inadequacies of the natural flow and common enemy doctrines. See 5 WATER RIGHTS, *supra* note 12, § 453.1.

65. 67 Pa. 351 (1871).

66. *Id.* at 352.

67. *Id.* at 354.

68. See *id.* at 355.

69. 132 Pa. 216, 18 A. 1114 (1890).

70. *Id.* at 216, 18 A. at 1114.

adequate drainage systems to cases where the landowner charged had *developed* his property, thus no liability could be imposed upon the defendant for failure to provide drainage for his *unimproved* parcel.⁷¹

The *Bentz* rule reached its fullest development in two Pennsylvania Superior Court cases decided in 1896 and 1897. In both *Davidson v. Sanders*⁷² and *McMahon v. Thornton*⁷³ the defendants had graded and developed land in an urban area, thereby concentrating and accelerating water runoff onto a neighboring property.⁷⁴ In *Davidson*, the court relied upon the dicta in *Bentz* and found the grading plan and its resultant flooding to be negligent.⁷⁵ In *McMahon*, the court articulated the applicable test as follows:

[The defendant] must in such alteration of the land, when changing it from the face that nature has put upon it to conform to his own idea of that which is desirable, take care of all the water that falls or flows upon the land and conduct it off the new surface adapted to his own fancy in such a way as will cause no injury to the adjoining tenements.⁷⁶

The *McMahon* court also commented upon the status of the *Bentz* doctrine:

[The doctrine has] stood without qualification or limitation for over fifty years. It seems to have been so universally accepted as a correct exposition of law, that the Supreme Court has in no case since that time been called upon to reconsider the question of the right to recover by one lot owner in the city or town for injury to his property by an adjoining property owner who has built upon and improved his lot, by the flowing of surface or rain water from the one to the other.⁷⁷

The universal acceptance of *Bentz* was, however, short-lived. Within a decade after *Davidson* and *McMahon* the reasonable care rule for urban areas was replaced by the maxims and policies of the common enemy rule.⁷⁸

71. *Id.* at 217, 18 A. at 1114.

72. 1 Pa. Super. Ct. 432 (1896).

73. 5 Pa. Super. Ct. 495 (1897).

74. *Id.* at 497; 1 Pa. Super. Ct. at 433.

75. 1 Pa. Super. Ct. at 438.

76. 5 Pa. Super. Ct. at 503.

77. *Id.* at 502, quoting *Davidson v. Sanders*, 1 Pa. Super. Ct. 432, 437 (1896).

78. See *Rielly v. Stephenson*, 222 Pa. 252, 70 A. 1097 (1908). For a discussion of the development of the urban common enemy rule, see notes 139-193 and accompanying text *infra*.

D. *Development of the Civil Law Rule in Rural Areas*

A few years after *Bentz*, the Pennsylvania Supreme Court first squarely addressed the problems of rural drainage law. In *Martin v. Riddle*,⁷⁹ a cemetery company collected the water falling upon its hillside parcel and discharged it upon the defendant's land.⁸⁰ The defendant, in turn, obstructed the water and caused the runoff to discharge onto a public road, from which it flowed onto neighboring lots causing injury to the plaintiff.⁸¹ Finding a paucity of Pennsylvania precedent on the subject, the court turned to "books of a foreign origin"⁸² — primarily civil law materials — to resolve the problem. The court stated the classic formulation of the civil law's natural flow principle as follows:

Where two fields adjoin, and one is lower than the other, the lower must necessarily be subject to all the natural flow of water from the upper one. The inconvenience arises from its position, and is usually more than compensated by other circumstances. Hence the owner of the lower ground has no right to erect embankments whereby the natural flow of the water from the upper ground shall be stopped; nor has the owner of the upper ground a right to make any excavations or drains by which the flow of water is directed from its natural channel, and a new channel made on the lower ground; nor can he collect into one channel waters usually flowing off into his neighbour's fields by several channels, and thus increase the wash upon the lower fields.⁸³

The justices suggested that an agricultural property owner could cover up and conceal drains "keeping the place of discharge unchanged."⁸⁴ Further dicta implied that an owner might even "use proper means" in draining moist land and discharge the water "according to the natural channel, even though the flow of water upon his neighbor might be thereby somewhat increased."⁸⁵ However, no owner could — as was attempted by the cemetery company — direct to a single point formerly diffused runoff and discharge it upon another's land.⁸⁶ Thus, the defendant was found to

79. 26 Pa. 415 (1856) (summary affirmance accompanying case of *Kauffman v. Griesemer*, 26 Pa. 407 (1856)).

80. 26 Pa. at 415.

81. *Id.*

82. *Id.* at 416.

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.* at 417.

have a right to block the unlawful discharge “[i]f he could stop it without injury to any but the cemetery company.”⁸⁷ He could not, however, obstruct the flow by turning it upon the road to harm others.⁸⁸

The court further expounded upon the civil law rule in *Kauffman v. Griesemer*.⁸⁹ There the complaining upper landowner alleged that the defendant, who owned lower adjacent lands, had unlawfully blocked a natural drainway by means of a sod dam.⁹⁰ It was found, however, that the plaintiff had installed a ditch to drain a spring or pond on his land, causing the water to flow onto the defendant’s parcel.⁹¹ Prior to the installation of the ditch, waters from the plaintiff’s pond and surrounding areas had flowed onto the neighboring lands only in times of freshet or flood.⁹² *Kauffman* recognized as the basis of the natural flow the maxim *aqua currit et debet currere* (water runs, and ought to run, as it has used to run).⁹³ The court rejected the restrictive construction of the natural flow standard propounded by contemporary decisions in other states, such as New Jersey, which held that no upper landowner, under any circumstances, could cause a greater quantity of water than that which would naturally flow over the land of another.⁹⁴ Such a rule, the justices concluded, would force a proprietor to abandon the land “to perpetual sterility, or never vary the course of cultivation, simply because such acts would produce some change in the manner of discharging the water.”⁹⁵ The court noted that certain activities, such as those in *Martin*,⁹⁶ which increase water running off through natural drainageways might be allowed, but runoff changes would not be permitted if the increased volume could not be discharged through natural channels and outlets.⁹⁷ Moreover, the decision indicated that no owner would have a right to dig an artificial channel to drain waters onto neighbouring properties when that water would not have ordinarily flowed there.⁹⁸ Because the plaintiff in *Kauffman* had attempted artificially to drain pond waters that would have reached the defendant’s land only in freshets, the court

87. *Id.*

88. *Id.*

89. 26 Pa. 407 (1856).

90. *Id.* at 408.

91. *Id.* at 411-12.

92. *Id.*

93. *Id.* at 413.

94. *Id.* at 414, citing *Merritt v. Parker*, 1 N.J.L. 460 (1795).

95. 26 Pa. at 413.

96. See notes 79-88 and accompanying text *supra*.

97. 26 Pa. at 414.

98. *Id.*

ruled that the defendant had a right to build a dam to throw back this unlawful inundation.⁹⁹

Although the general principles which guide Pennsylvania's application of the civil law doctrine were articulated in *Martin and Kauffman*, they left many important questions unanswered. At what point might "use of proper means" in draining land become unlawful collection, diversion, and discharge of diffused waters?¹⁰⁰ What constitutes a "natural channel"¹⁰¹ which is subject to the servitude of drainage by upper lands?¹⁰² To what extent can an upper landowner increase or accelerate the flow of diffused water or water in a natural drainage channel without incurring liability?

1. *Collection and Diversion*

The clearest case of unlawful collection and diversion is the installation of an artificial drain to discharge marsh or spring waters that previously "only saturated the earth without running off by a defined channel."¹⁰³ Similarly prohibited is the construction of a ditch to divert waters from their natural course and to discharge the diverted runoff at a point where the waters would not naturally flow.¹⁰⁴ Another example of an unlawful collection and diversion is found in *In re Limerick & Colebrookdate Turnpike Co.*¹⁰⁵ In order to drain water from a highway, the *Limerick* road company had constructed a culvert with three outlets, one of which was on the defendant's land.¹⁰⁶ The company allowed the defendant's neighbors to obstruct the two outlets on their land, forcing all of the drainage through defendant's property.¹⁰⁷ The defendant was held to have a self-help right to dam off the "extraordinary flood."¹⁰⁸

The case of *Meixell v. Morgan*¹⁰⁹ indicated that the prototypical violation of the collection and diversion rule occurs when the upper, or dominant, landowner gathers together diffused surface waters that would otherwise have flowed in many directions and discharges

99. *Id.* at 414-15.

100. See note 80 and accompanying text *supra*.

101. See notes 83-85 and accompanying text *supra*.

102. It should be noted that the term "natural channel" as used in the civil law doctrine to define the drainage paths which are subject to the servitude is not necessarily identical or even analogous to the common enemy rule concept of "watercourse" or "channel," which delineates an exception to the common enemy doctrine. See notes 152-160 and accompanying text *infra*.

103. *Miller v. Laubach*, 47 Pa. 154, 155 (1864).

104. See *Hays v. Hinkleman*, 68 Pa. 324 (1871).

105. 80 Pa. 425 (1876).

106. *Id.*

107. *Id.* at 426.

108. *Id.* at 426-27.

109. 149 Pa. 415, 24 A. 216 (1892).

them at a point where they did not previously flow. In *Meixell*, the defendant, who was the owner of the upper property, had installed tile drains to aid the cultivation of his land.¹¹⁰ The water collected in the tile drains was discharged into a ditch which ran through the plaintiff's farm.¹¹¹ The lower court ruled that the defendant had a right to lay the artificial drains to carry off ordinary rainfall and discharge it at one point if: 1) the point of discharge was the natural watershed for both tracts of land; 2) the waters on the upper land would naturally have drained through the ditch which flowed through the lower land; and 3) the drainage scheme installed by the upper landowner did not materially increase the flow over the lower land to the plaintiff's injury.¹¹² The Pennsylvania Supreme Court affirmed, noting, however, as to the third point, that some increase in flow would be allowed as long as care was taken not to cause "unnecessary injury" to the lower owner.¹¹³

Thus, the gravamen of the collection and diversion test is the change in the natural point of discharge. If the waters would have flowed over the lower land in a diffused condition, they may not be artificially collected into a single channel; but if they naturally flow through the lower land in a drainage channel, the upper owner may install artificial drains to collect the surface water and discharge them into that natural channel, releasing them to flow as they would have naturally.

2. *Drainage Courses Subject to a Servitude*

The rule in *Martin* is stated alternatively. The lower parcel of land is subject to the "natural flow of water" from the upper property.¹¹⁴ Conversely, the owner of the upper ground has no right "to make any excavations or drains by which the flow of water is directed from its natural channel; nor can he collect into one channel waters usually flowing off into his neighbour's fields by several channels . . ." ¹¹⁵ The use of the terms "natural flow" and "natural channel" in *Martin* and subsequent decisions may have created some ambiguity. Often the term "natural channel" or "natural drainage course" is confused with definitions of a "watercourse" or "stream" derived from other contexts.¹¹⁶ For purposes of drainage, a "natural drainage course" is not necessarily limited to a stream

110. *Id.*

111. *Id.*

112. *See id.* at 417, 24 A. at 216.

113. *Id.* at 418, 24 A. at 216; *see* notes 128-152 and accompanying text *infra*.

114. *See* notes 79-83 and accompanying text *supra*.

115. 26 Pa. at 416; *see* note 83 and accompanying text *supra*.

116. *See* notes 13-25 and accompanying text *supra*.

having a defined bed and banks to which riparian rights may attach.¹¹⁷ Indeed, definitions of "natural flow" or "channel" which are used when applying the civil law rule may be quite different from those found in the natural channel exception to the common enemy rule.¹¹⁸ As used in the civil law context, the term "channel" is a misnomer. The civil law drainage rule mandates maintenance of the natural flow of *diffused* surface water, and not merely preservation of water in streams or drainage courses. Consequently, the natural flow doctrine prohibits a change in the direction or discharge points of all surface runoff.

A few cases may be illustrative. In *Hays v. Hinkleman*,¹¹⁹ the plaintiff complained that the defendant had diverted the natural runoff and caused it to flow through his field.¹²⁰ The natural course of drainage from the defendant's property, which swelled to a considerable stream each spring, appeared to be by way of a hollow or ravine.¹²¹ The court's factual statement suggested that this "stream" flowed only in times of spring freshets.¹²² Under traditional definitions of a watercourse, this hollow or ravine with only freshet flow would hardly qualify as a stream for riparian doctrine purposes.¹²³ Yet, applying the civil law rule, the justices found that the defendant had altered the natural course of the water and cast it upon the plaintiff's land.¹²⁴ The ground for the ruling was not the diversion of a *stream*, but the diversion of the natural *flow* and *direction* of drainage.¹²⁵ A more accurate terminology was used in *Rhoads v. Davidheiser*.¹²⁶ The test, according to the *Rhoads* court, is whether the person charged had diverted "water from the course which nature . . . provided for it . . . to the injury of the lower field" ¹²⁷

Thus, under the natural flow/civil law rule, the servitude attaches to the natural mode of runoff, whether in a diffused state or in defined channels. The obstruction or diversion of diffused or

117. *See id.*

118. For a discussion of this exception, *see* notes 152-160 and accompanying text *infra*.

119. 68 Pa. 324 (1871).

120. *Id.*

121. *Id.* at 326.

122. *See id.*

123. *See* notes 16-20 and accompanying text *supra*.

124. 68 Pa. at 326.

125. *See id.*; *accord*, *Huddleston v. Borough of West Bellevue*, 111 Pa. 110, 122, 2 A. 200, 203 (1885) (borough found liable for construction of gutter which bypassed natural depressions or ravines through which runoff had formerly flowed).

126. 133 Pa. 226, 19 A. 400 (1890).

127. *Id.* at 233, 19 A. at 401, *quoting* E. WASHBURN, ON EASEMENTS 450 (3d ed. 1873).

defined runoff is actionable, and the existence of a defined channel or watercourse is irrelevant to the civil law doctrine.

3. *Acceleration of Natural Flow*

Martin and *Kauffman* suggested that rural landowners could reasonably increase the flow onto lower lands by means of drainage systems as long as the place of discharge was unchanged.¹²⁸ However, the following question remains: How much of an increase is reasonable?

The starting point of the civil law test is natural flow.¹²⁹ The two clearest violations of that standard are 1) concentrating the discharge of diffused waters at a particular point,¹³⁰ and 2) increasing the area of the land drained by means of grading or installation of storm sewers.¹³¹ Thus, *Magee v. Pennsylvania Schuylkill Valley R.R.*¹³² held that an upper proprietor could not install a pipe to discharge onto his lower neighbor's land water from adjacent properties that would have been naturally absorbed on his land.¹³³ The court noted that this prohibition would apply "even though no additional water [would run] from the pipe than [that] quantity which would have been absorbed" on the upper owner's parcel.¹³⁴

The position adopted in *Magee* seems to suggest that if water would be absorbed naturally on the upper land, it may not be conducted off the land by artificial means. Such a reading of *Magee* might lead to the conclusion that the installation of drains or any impervious surfaces would be precluded because such alterations, by their nature, intercept some waters that would otherwise percolate into the ground. This broad interpretation is not, however, the Pennsylvania rule. The Pennsylvania Supreme Court has repeatedly stated:

"[F]or the sake of agriculture, a man may drain his ground which is too moist, and discharging the water according to its natural channel, may cover up and conceal the drains through his lands; . . . and may clear out impediments in the natural channel of his streams, though the flow of water on his neighbor's land be thereby increased" ¹³⁵

128. See notes 79-99 and accompanying text *supra*.

129. See notes 27-30 and accompanying text *supra*.

130. See notes 103-113 and accompanying text *supra*.

131. See *Frederick v. Lansdale Borough*, 156 Pa. 613, 27 A. 563 (1893).

132. 13 Pa. Super. Ct. 187 (1900).

133. *Id.* at 196-97.

134. *Id.* at 196.

135. *Meixell v. Morgan*, 149 Pa. 415, 418, 24 A. 216, 216 (1892), quoting *Kauffman v. Griesemer*, 26 Pa. 407, 413-14 (1856).

The court has recognized that the "very act of draining land necessarily increases the flow of water."¹³⁶ The test is not whether the drainage, grading, or development of land measurably accelerates runoff, but whether care has been taken "not to cause unnecessary injury to the owner of the servient tenement."¹³⁷ If an upper landowner's actions significantly increase the amount of water discharged in the natural drainage path, then reasonable care must be exercised to avoid injury to lower proprietors.¹³⁸

E. Development of the Common Enemy Approach in Urban Areas

While the interstices of the civil law rule were explored by the Pennsylvania courts, cases in other fields laid the foundation for the acceptance of the common enemy rule. Most notably, in 1886, the Pennsylvania Supreme Court announced its remarkable decision in *Pennsylvania Coal Co. v. Sanderson*,¹³⁹ holding that a mining company had an absolute right to pump acid-polluted water into a stream as part of the "natural" use of its land.¹⁴⁰ The *Sanderson* rationale, upon which was built many of the more notorious lines of water law doctrine,¹⁴¹ was succinctly stated: "[E]very man is entitled to the ordinary and natural use and enjoyment of his property"¹⁴²

The court applied this principle in 1906 in *Strauss v. City of Allentown*¹⁴³ to underpin what would become the common enemy rule for urban areas. In *Strauss*, the owner of a mill bordering the city limits, complained that urban development had prevented natural absorption of the water and had greatly accelerated water runoff, causing extensive erosion and debris damage.¹⁴⁴ The Court relied upon each landowner's "right to the natural, proper and profitable use of his own land" to rule that, absent negligence, an unavoidable loss imposed upon proprietors by the "ordinary and regular course of expansion of the city" is not actionable.¹⁴⁵

136. 149 Pa. at 418, 24 A. at 216 (1892).

137. *Id.*

138. See *Elliott v. Oil City*, 129 Pa. 570, 18 A. 553 (1889) (plaintiff recovered where city installed larger culvert through road, allowing increased runoff from developing area to discharge through natural ravine, damaging house).

139. 113 Pa. 126, 6 A. 453 (1886).

140. *Id.* at 151, 6 A. at 460.

141. See R. WESTON & M. GANG, *supra* note 33, at 25-32.

142. 113 Pa. at 145, 6 A. at 456. It is interesting to note that in the process of explaining this statement, the court explicitly recognized the natural flow rule. *Id.*

143. 215 Pa. 96, 63 A. 1073 (1906).

144. *Id.* at 97, 63 A. at 1073.

145. *Id.* at 98, 63 A. at 1073.

Full statement of the rule came only two years later, as the court abandoned the *Bentz* doctrine¹⁴⁶ in favor of a common enemy approach. By increasing the grade of a lot on a hillside, the defendant in *Rielly v. Stephenson*¹⁴⁷ caused diffused water which formerly flowed over his property to discharge onto his neighbor's land.¹⁴⁸ The court noted that the discharge was the natural and inevitable consequence of the defendant's improvement of his lot and that no claim of negligent execution of the project by the defendant was asserted.¹⁴⁹ In upholding the legitimacy of the defendant's actions, the court stated:

The owners of lots in cities and towns buy and own with the manifest condition that the natural or existing surface is liable to be changed by the progress of municipal development. All such owners have equal rights neither lessened nor increased by priority of improvement, and the primary right of each owner is to protect himself and his lot from loss or inconvenience from the flow of surface water. The owner at the foot of the slope is under no obligation to allow his lot to continue as a reservoir for the surplus water of the neighborhood. He may shut it out by grading or otherwise and the fact that thereby he may incidentally increase the flow on the adjoining lot, neither makes him answerable in damages nor affects the adjoining owner's right in his turn to shut out the original, plus the increased flow on his lot. The owner cannot be coerced as to time or manner of improvement by risk of having put upon him the burden of providing for the flow upon others.¹⁵⁰

Despite this broad pronouncement of the urban property owners' rights, the *Rielly* court emphasized that these rights are not absolute:

[The urban property owner] may not proceed negligently so as to do unnecessary damage to others. But so far as he acts upon his right to protect his enjoyment of his own property, any incidental loss to his neighbor is *damnum absque injuria*. It is clearly settled, however, first, that he may not obstruct a natural channel for the flow of the water, or a channel that has acquired the character of an easement; and, secondly, he may not gather surface water into a body and discharge it on the adjoining land.

146. For a discussion of the *Bentz* doctrine, see notes 55-77 and accompanying text *supra*.

147. 222 Pa. 252, 70 A. 1097 (1908).

148. *Id.* at 254, 70 A. at 1098.

149. *Id.*

150. *Id.* at 256, 70 A. at 1099.

His right is to shut out the invading water, as a common enemy, for the protection of his own land.¹⁵¹

The *Rielly* doctrine, while comprehensively framed, left several issues open to further litigation. What constitutes a "natural channel" which cannot be obstructed? Under what circumstances can the improvement of property be found to be "negligent," resulting in "unnecessary damage" to other lands? To what extent may an owner install artificial drains before becoming accountable for "gathering the water into a body?"

1. *The Natural Channel Exception*

The common enemy doctrine announced in *Rielly* applies only to diffused surface water. No property owner has the right to obstruct natural watercourses or channels which have gained the status of an easement by prescription.¹⁵² Only waters flowing over the land in a diffuse condition may be diverted, obstructed, or artificially collected without liability.

The concept of a "natural channel" for purposes of this exception to the common enemy rule appears to be more restricted than the natural channel definition applicable under the civil law doctrine.¹⁵³ Under the common enemy rule, the meaning of the terms "watercourse" and "natural channel" is confined to "a stream of water usually flowing in a definite channel, having a bed and sides or banks."¹⁵⁴ Essentially, the obstruction exception is limited to streams and brooks which are subject to riparian rights.¹⁵⁵ The exception may, however, extend to artificial channels which, due to long existence and continued use, have acquired the status of an easement by prescription. For example, in *Rohrer v. Harrisburg*,¹⁵⁶ the city was charged with blocking drainage in a ditch located along a portion of road annexed by the municipality.¹⁵⁷ The ditch had existed for over thirty years and had "at least the weight of long continued sanction of local officials in deciding what was necessary to preserve the highways."¹⁵⁸ It was held that the ditch, although not a natural watercourse, had acquired the status of "the natural

151. *Id.* at 256-57, 70 A. at 1099.

152. *Id.*

153. For a discussion of the natural channel definition of the civil law doctrine, see notes 114-127 and accompanying text *supra*.

154. *Kunkle v. Ford City Borough*, 305 Pa. 416, 420, 158 A. 159, 160 (1931); quoting 28 AM. & ENG. ENCYC. OF L. 944 (C. Williams ed. 1895).

155. See notes 16-20 and accompanying text *supra*.

156. 20 Pa. Super. Ct. 543 (1902).

157. *Id.* at 546.

158. *Id.* at 548.

course of water," that is, the character of a drainage easement.¹⁵⁹ Therefore, the court upheld the jury's finding that the city was liable for negligently obstructing the ditch, and throwing waters upon the lands of adjacent private owners.¹⁶⁰

2. *Liability for Negligent Improvement Causing Unnecessary Damage*

The extent of a landowner's right to collect and divert surface drainage in the course of development was not fully settled by *Rielly*.¹⁶¹ Clearly, no automatic liability arises from modification of natural drainage. As stated in *Wilson v. McCluskey*:¹⁶²

[T]he owner of a lot in a city or town, in grading and improving the lot may shut out the surface flow upon his lot without any obligation on his part to prevent it from flowing over the adjacent land, or to lead it by artificial or other means to a sewer or other avenue of escape¹⁶³

However, in modifying the natural drainage, the owner may not proceed negligently to the detriment of other landowners.¹⁶⁴ Negligence is generally defined as the failure to exercise ordinary, due, or reasonable care in the performance of an activity.¹⁶⁵ In the area of drainage, under the *Rielly* rationale, land owners would seem to be compelled to use reasonable care in improving their properties in order to avoid unnecessary damage to neighboring lands. However, the judicial interpretation given the negligence standard has been more restricted.

The *Rielly* rule did not impose liability merely because the damages inflicted upon neighboring lands by drainage changes

159. *Id.*

160. *Id.* *But see* *Lorah v. Amity Township*, 35 Pa. Super. Ct. 529 (1908) (court rejected claim of prescriptive easement in roadside ditch and held that adjacent owners had no right adverse to township when owners had used the ditch for drainage over a 30-year period).

161. *See* notes 147-152 and accompanying text *supra*.

162. 46 Pa. Super. Ct. 594 (1911).

163. *Id.* at 597.

164. *Id.*; *Tess v. Charleroi Home Bldg. Co.*, 96 Pa. Super. Ct. 505 (1929); *White v. Philadelphia & Reading R.R.*, 46 Pa. Super. Ct. 372 (1911).

165. W. PROSSER, *supra* note 54, §§ 30-31; RESTATEMENT (SECOND) OF TORTS §§ 282-283, 298 (1965). It should be noted that in the area of drainage rights — as contrasted with, for example, groundwater problems — the issue of foreseeability is rarely raised. *Compare* *Zimmerman v. Union Paving Co.*, 135 Pa. Super. Ct. 373, 4 A.2d 319 (1938), and *Wheatley v. Baugh*, 25 Pa. 528 (1855), *with* *Pfeiffer v. Brown*, 165 Pa. 267, 30 A. 844 (1895), and *Wilson v. McCluskey*, 46 Pa. Super. Ct. 594 (1911). The potential damage to lower lands caused by changing drainage paths is usually evident from the surface contours of the land. Gravity and common experience leave little to speculation.

could have been avoided by an inexpensive modification of the improvement plan.¹⁶⁶ The standard is "not simply whether the increased flow was preventable, by the defendants improving their lot in some other manner."¹⁶⁷ Generally, the owner is free to choose the "time and manner of improvement" unhindered by considerations of the flow of drainage upon others.¹⁶⁸ However, if, having selected a development plan, the proprietor causes unnecessary damage to others through negligent *implementation* of the plan, liability may be imposed.¹⁶⁹

Perhaps the most extensive explanation of the negligence test in drainage matters was presented in *Pfeiffer v. Brown*,¹⁷⁰ a case that preceded *Rielly* but recognized the same basic rules. In *Pfeiffer*, the defendant had drilled an oil well that pumped out salt water in the process of extracting crude petroleum.¹⁷¹ In response to the defendant's release of the salt water onto the plaintiff's land, the plaintiff constructed a channel to carry away the saline water and then sued for costs and damages.¹⁷² Although recognizing that the defendant had a right under *Sanderson* to the "natural use and enjoyment of his own land,"¹⁷³ the court posited:

[T]he use which inflicts the damage must be natural, proper, and free from negligence, and the damage unavoidable. . . . Hence the practical inquiry is, first, whether the damage was necessary and unavoidable; secondly, if not, was it sufficiently obvious to have been foreseen, and also preventable by reasonable care and expenditure?¹⁷⁴

Thus, liability may be imposed if, by the exercise of reasonable judgment or investigation, a landowner could have known that injury to others would result from an activity, and the expenditure of a reasonable amount of money might have prevented the damage. The *Pfeiffer* court concluded that the defendant should have foreseen the results of indiscriminate release of the salt water, and that the

166. See 46 Pa. Super. Ct. 594 (1911).

167. *Id.* at 599.

168. 222 Pa. 252, 256, 70 A. 1097, 1099 (1908).

169. The basis of liability for individual proprietors is derived from the rule imposing liability on municipalities for the negligent design and implementation of community improvements and storm drainage plans. See notes 325-378 and accompanying text *infra*.

170. 165 Pa. 267, 30 A. 844 (1895).

171. *Id.* at 273, 30 A. at 845.

172. *Id.* at 268.

173. *Id.* at 273, 30 A. at 845, citing *Pennsylvania Coal Co. v. Sanderson*, 113 Pa. 126, 6 A. 453 (1886).

174. 165 Pa. at 273, 30 A. at 845, quoting *Collins v. Chartiers Valley Gas Co.*, 131 Pa. 143, 18 A. 1012 (1890).

simple device of channeling it away from the plaintiff's property was an obvious means of avoiding the damage.¹⁷⁵

The central question is whether the damage caused by lawful improvement of land is avoidable or unnecessary. In this regard, the court in *Pfeiffer* announced several general principles that would appear to be of continuing validity today:

It is not to be lost sight of that the defendant's right to injure another's land at all, to any extent, is an exception, and the burden is always upon him to bring himself within it. And his exception is founded on necessity and because otherwise he would himself be deprived of the beneficial use and enjoyment of his own land. . . . If the expense of preventing the damage from his act is such as practically to counterbalance the expected profit or benefit, then it is clearly unreasonable, and beyond what he could justly be called upon to assume. If on the other hand, however large in actual amount, it is small in proportion to the gain to himself, it is reasonable in regard to his neighbor's rights, and he should pay it to prevent the damage, or should make compensation for the injury done. Between these two extremes lies a debatable region where the cases must stand upon their own facts.¹⁷⁶

If the damage could have been prevented short of "detracting from the purpose and benefit of the contemplated act" and depriving the defendant of the use of his own property, the defendant will be held liable.¹⁷⁷

3. *Collection and Diversion of Storm Water*

Both *Strauss* and *Rielly* recognized a limit to the common enemy doctrine.¹⁷⁸ The court in *Rielly* warned that no landowner or municipality would be allowed to "gather surface water into a body and discharge it on the adjoining land."¹⁷⁹ Accordingly, the bounds of the common enemy rule would be exceeded if a proprietor, through the use of an artificial channel, concentrated and discharged what would otherwise be surface water at a particular point on the servient land in greater volume than would normally flow thereon.¹⁸⁰

175. 165 Pa. at 273-74, 30 A. at 845.

176. *Id.* at 274, 30 A. at 845.

177. *Id.* It should be noted that the superior court in *Wilson v. McCluskey*, 46 Pa. Super. Ct. 594 (1911), apparently disregarded these principles, which were embodied in the lower court's jury charge. See notes 162-165 and accompanying text *supra*.

178. See text accompanying notes 145 & 151 *supra*.

179. 222 Pa. at 257, 70 A. at 1099.

180. See 215 Pa. at 98-99, 63 A. at 1073.

This distinction appears to be drawn from earlier civil rule cases,¹⁸¹ and injects an element of the "natural flow" criteria into the common enemy theory. Thus, in *Torrey v. City of Scranton*,¹⁸² the supreme court ruled that, while a municipality would not be liable for flooding of private property caused by inadequate gutters, drains, culverts, or sewers, it could not "throw a body of water upon the property of one of its citizens which would not naturally have flowed there."¹⁸³ This broad statement hardly comports with the general understanding of the common enemy rule.¹⁸⁴ If read to incorporate the natural flow tests derived in civil law cases, it would bar any change of grade or natural drainage which might modify the direction of water flow. The traditional deference accorded to owners in the development of their land¹⁸⁵ would be reversed.

The collection and diversion exception to the common enemy doctrine is far narrower in application. The test is not merely whether the direction of flow has been changed. Rather the gravamen of the exception is the accumulation of a volume and force of water,¹⁸⁶ which by means of artificial channels is cast upon neighboring lands.¹⁸⁷ The deliberate channeling of runoff onto other properties, in a manner which causes foreseeable harm, cannot be condoned within the rationale of the common enemy rule. This point was underscored in *Lehigh & Wilkes-Barre Coal Co. v. Pittston Coal Mining Co.*¹⁸⁸ *Lehigh* involved a drainage dispute between two adjoining mine owners.¹⁸⁹ It appeared that the defendant had collected mine water in a tunnel and ditch and discharged it among broken rocks at the terminus of the tunnel from whence it percolated into the plaintiff's mine.¹⁹⁰ On the basis of *Sanderson*, the defendant argued that the "time honored maxim, [s]ic utere tuo ut alienum non laedas" (Use your property in such manner as not to injure that of another) was inapplicable to coal mining in Pennsylvania.¹⁹¹ The Pennsylvania Supreme Court flatly rejected this proposition, stating:

The right to use land for agricultural or mining purposes in the usual and proper manner, although it may result in some

181. See, e.g., *Miller v. Laubach*, 47 Pa. 154 (1864). For a discussion of the civil law rule of collection and diversion, see notes 103-113 and accompanying text *supra*.

182. 133 Pa. 173, 19 A. 351 (1890).

183. *Id.* at 180, 19 A. at 351.

184. See Hanks, *supra* note 27, at 694.

185. See notes 50-54 and accompanying text *supra*.

186. See Hanks, *supra* note 27, at 695, 697.

187. See *Morton v. Dormont Borough*, 334 Pa. 283, 5 A.2d 803 (1939); *Lehigh & Wilkes-Barre Coal Co. v. Pittston Coal Mining Co.*, 289 Pa. 492, 137 A. 672 (1927).

188. 289 Pa. 492, 137 A. 672 (1927).

189. *Id.* at 494, 137 A. at 672.

190. *Id.*

191. *Id.* at 496, 137 A. at 673 (emphasis in original).

additional flow of surface water upon the land of an adjoining owner, is undoubted, but the right to collect such water and conduct it upon another's land through an artificial channel cannot be sustained. While proper farming or mining may affect the flow of surface water, yet, when it departs it must be in a natural course and not collected together and cast upon lower land by artificial means.¹⁹²

Indeed, the court found that grading the ditch toward plaintiff's land, rather than pumping the water to the surface or draining the water into a sump, established "defendant's *intent* to rid itself of surplus water at plaintiff's expense."¹⁹³

F. *Modification and Refinement of Drainage Rules — The Challenge of Large-Scale Developments*

By the third decade of the twentieth century the broad elements of Pennsylvania drainage law had been established. In the ensuing fifty years, they have been refined, modified, criticized, distinguished, and otherwise contorted to meet the intensifying problems of storm water management and drainage impacts of large-scale development. Several interrelated issues have become increasingly troublesome: 1) whether the distinction between urban and rural land is rational or practical; 2) the selection of the appropriate set of rules to apply to development in formerly rural, suburbanizing areas; and 3) whether traditional drainage rules serve the public interest and provide justice in the case of major developments.

*Tess v. Charleroi Home Building Co.*¹⁹⁴ raised several of these issues. In *Tess*, the plaintiff owned a home at the lower end of a hillside, and the defendant developer possessed an upper parcel of land that had been used as a pasture prior to being subdivided.¹⁹⁵ Concrete streets and sidewalks were installed on fill, and although the grading of the subdivision and the deposits of shale and clay to support the streets reduced the land area draining toward the plaintiff, the defendant's removal of the sod and placement of the fill caused surface runoff to carry sediment and debris onto the lower lots.¹⁹⁶ Despite the prior rural use of defendant's subdivision, the superior court ruled the area to be "urban" land; accordingly, the court applied the common enemy rule to hold that, absent

192. *Id.* at 497, 137 A. at 673.

193. *Id.* at 497-98, 137 A. at 673 (emphasis added).

194. 96 Pa. Super. Ct. 505 (1929).

195. *Id.* at 507.

196. *Id.*

negligence, the developer was not liable for the deposit of dirt, soil, or off-scourings onto lower neighbors.¹⁹⁷ Thus, the defendant had a right to alter the water drainage as part of "the natural, proper, and profitable use of his own land."¹⁹⁸

The degree of negligence required to impose liability on a developer was severe under the early cases. Rejecting the argument that, since the "average man" has little knowledge of geological or mechanical principles, a developer is not liable for a fill that causes a landslide onto neighboring property, the Pennsylvania Supreme Court held that negligence could be established when a developer who had been previously warned by the injured parties of the danger failed to take proper precautions.¹⁹⁹ Absent such blatant disregard of a clear warning, courts were reluctant to find negligence in the early drainage cases.²⁰⁰ As long as the developer "acts upon his right to protect his enjoyment of his own property, any incidental loss to his neighbor is *damnum absque injuria*."²⁰¹

In the course of later cases, some of these common enemy rule elements became confused with natural flow, civil law doctrines. For example, the superior court in *Beals v. Robertson*²⁰² mixed maxims under both rules to hold that a mine operator had a right both to install openings in a previously abandoned mine and to drain water into a ravine forming a "natural watercourse" through his neighbor's land.²⁰³ According to the court:

The defendants being the owners of the upper land, have the right to have the water flowing from their land discharged in a natural water course upon the lower (plaintiffs') land. While they may not make new channels, nor concentrate and increase the flow of waters by artificial means, they may increase the flow through the natural and reasonable use of their land. Being descendible by nature, "waters flow and ought to flow" upon the servient tenement, i.e. the lower land.²⁰⁴

The court failed to explain why installation of an opening from a deep mine to the surface, allowing water to drain where it had not

197. *Id.* at 508.

198. *Id.*, quoting *Strauss v. City of Allentown*, 215 Pa. 96, 63 A. 1073 (1906); see also *Kuczineski v. Scranton Coal Co.*, 99 Pa. Super. Ct. 20 (1930).

199. *Gordon v. Pettey*, 291 Pa. 258, 139 A. 914 (1927).

200. See *Kuczineski v. Scranton Coal Co.*, 99 Pa. Super. Ct. 20, 24 (1930).

201. *Rielly v. Stephenson*, 222 Pa. 252, 256, 70 A. 1097, 1099 (1908).

202. 159 Pa. Super. Ct. 325, 48 A.2d 56 (1946), *aff'd*, 356 Pa. 348, 52 A.2d 316 (1947).

203. 159 Pa. Super. Ct. at 327, 48 A.2d at 57.

204. *Id.* at 327-28, 48 A.2d at 57, citing, *inter alia*, *Kauffman v. Griesemer*, 26 Pa. 407 (1856) (civil law rule applied), and *Lehigh & Wilkes-Barre Coal Co. v. Pittston Coal Mining Co.*, 289 Pa. 492, 137 A. 672 (1927) (common enemy rule applied).

flowed previously, constituted a "natural and reasonable use" rather than an "artificial concentration and discharge."²⁰⁵

The Pennsylvania Supreme Court similarly combined civil law and common enemy rules in *Lucas v. Ford*,²⁰⁶ where it ruled that a coal tippie owner could install pipes along a natural watercourse to carry drainage from a public highway to the plaintiffs' land. Although the pipes did not result "in any increase in the amount of surface water reaching" the plaintiffs' property, they deposited oil, dirt, and other sediment harmful to the land.²⁰⁷ Finding that "some type of drainage system was clearly necessary if defendants were to make use of their property,"²⁰⁸ the court relied upon an odd fusion — or confusion — of doctrines to explain when a lower landowner incurs a legal injury:

The owner of upper land has the right to have surface waters flowing on or over his land discharged through a natural water course onto the land of another, but he may not cut an artificial channel to divert that water He may make proper and profitable use of his land even though such use may result in some change in quality or quantity of the water flowing to the lower land If that change is not unreasonable in relation to the use, any loss resulting to the owner of the lower land is *damnum absque injuria* In that connection, the upper owner may lay artificial drains in his land provided they do not divert the water from its natural course or cause unnecessary injury to the lower owner.²⁰⁹

205. See 159 Pa. Super. Ct. at 327, 48 A.2d at 57; notes 178-193 and accompanying text *supra*.

206. 363 Pa. 153, 69 A.2d 114 (1949).

207. *Id.* at 155, 69 A.2d at 116.

208. *Id.* at 156, 69 A.2d at 116.

209. *Id.* at 155-56, 69 A.2d at 116 (citations omitted). The similarity between the Pennsylvania versions of the civil and common enemy rules was noted at least indirectly in *Chamberlin v. Ciaffoni*, 373 Pa. 430, 96 A.2d 140 (1953), wherein the court stated:

Under the so-called "common-law" or "common-enemy rule," not only is an owner of higher land under no liability for damages to an owner of lower land caused by water which naturally flows from the one level to the other, but he can, at least in the development of urban property, improve his land by regrading it or erecting buildings thereon, without legal responsibility for any consequent diversion of surface waters from his property to that of adjoining owners, it being recognized that changes or alterations in the surface may be essential to the enjoyment of his property.

It is only where the owner of the higher land is guilty of negligence which causes unnecessary damage to the servient owner, or where, by an artificial channel, he collects and discharges surface waters in a body or precipitates them in greatly increased quantities upon his neighbor, that the latter may recover for any damage thereby inflicted.

Id. at 434-37, 96 A.2d at 142-43.

By 1955, the Pennsylvania Superior Court, in *Taylor v. Harrison Construction Co.*,²¹⁰ had difficulty perceiving that a “distinction has actually been made between urban and rural property.”²¹¹ In *Taylor*, a construction company had deposited fill on lands below the plaintiff blocking the natural runoff and causing pooling.²¹² Although the upper landowner had argued successfully in the lower court that the land was rural and that the natural flow rule would prohibit the defendant from blocking the drainage,²¹³ the superior court ruled that the owner of property could block the flow of surface water without liability to the higher land owner, providing he did not proceed negligently or obstruct a natural watercourse.²¹⁴ The court, however, did not necessarily determine the continuing validity of the rural-urban distinction, because it held, contrary to the lower court, that the “uncontradicted” evidence showed that the area involved was urban in character.²¹⁵

Massive residential and commercial developments in the mid-1950's presented the courts with troublesome disputes challenging the viability of common enemy drainage rules. In *Rau v. Wilden Acres*,²¹⁶ for example, the court considered an action against the developer of a large subdivision who had modified the drainage onto a lower farm. Runoff had formerly flowed in a diffused state through a swale to the plaintiff's lands.²¹⁷ In the process of subdividing, constructing houses, and paving streets, the defendant had lowered the swale, cut a channel through an earthen bank previously erected across the swale mouth, and thereby funneled the water into a body which discharged with greater force and in increased quantities at a particular point on the plaintiff's lower farm land.²¹⁸ The court found the defendant liable based upon the artificial diversion exception to the common enemy rule, with the crucial point apparently being the defendant's *concentration* of waters which would have otherwise flowed in a more diffused state through the swale.²¹⁹

210. 178 Pa. Super. Ct. 544, 115 A.2d 757 (1955).

211. *Id.* at 548, 115 A.2d at 759.

212. *Id.* at 546, 115 A.2d at 758.

213. *See id.* at 547, 115 A.2d at 759; *see also* notes 79-99 and accompanying text *supra*.

214. 178 Pa. Super. Ct. at 547, 115 A.2d at 759. The term “watercourse” in this context was that term as narrowly defined in *Kislinski v. Gilboy*, 19 Pa. Super. Ct. 453, 454 (1902). 178 Pa. Super. Ct. at 547 n.1, 115 A.2d at 759 n.1; *see* notes 18-20 and accompanying text *supra*.

215. 178 Pa. Super. Ct. at 748, 115 A.2d at 759.

216. 376 Pa. 493, 103 A.2d 422 (1954).

217. *Id.* at 495, 103 A.2d at 424.

218. *Id.* at 496, 103 A.2d at 424.

219. *Id.*; *accord*, *Posey v. Billings*, 81 Montgomery County L. Rep. 199 (C.P. 1961); *Hall v. Tomer*, 42 Westmoreland County L.J. 41 (C.P. 1960) (streets in subdivisions

A similar situation was presented a year later in *Leiper v. Heywood-Hall Construction Co.*,²²⁰ but with a different result. In *Leiper*, the defendant erected a residential development of 149 dwellings on former farm lands.²²¹ No gutters, sewers, reservoirs, or drains were installed to carry runoff, and waters from approximately twelve acres of the development drained toward the plaintiff's adjoining land through a natural gully.²²² The court found that "in building the houses and laying out of its streets, [the defendant had] necessarily diverted the flow of the water on its own property . . . [as] a . . . result of its proper and reasonable use of its land."²²³ The plaintiffs complained of increased runoff, yet the trial court concluded that the point of surface water discharge was not changed and that the development did not "unreasonably and unnecessarily change the quantity and quality" of the runoff.²²⁴ There is little doubt, however, that the subdivision and installation of streets substantially increased the amount of runoff.²²⁵ The primary reason that the defendant in *Leiper* avoided the liability imposed in *Rau* appears to be that the construction company had merely surcharged the natural gully with excess runoff, rather than installing artificial drains to concentrate the water.²²⁶ The fact that the impact of the drainage upon the lower owners was substantially the same in both cases did not deter the *Leiper* court from perpetuating the artificial diversion/natural channel distinction.²²⁷ In essence, the court

changed natural drainage and concentrated water). In 1966, the Montgomery County Court of Common Pleas interpreted *Chamberlin v. Ciaffoni*, 373 Pa. 430, 96 A.2d 140 (1953), and *Rau* as establishing four elements necessary to impose liability in a drainage case: 1) a diversion of waters from their natural course; 2) an unreasonable change in quantity or quality of the water; 3) a concentration and precipitation of water upon plaintiffs' property through the use of artificial drains or channels; and 4) damage to the plaintiffs' property which could have been avoided by reasonable care and expenditure. *Baker v. Netherwood Corp.*, 86 Montgomery County L. Rep. 281, 285 (C.P. 1966) (draining of spring through pipe to natural swale held nonactionable). There may still be some dispute as to whether all four elements are required for liability. The rule in *Chamberlin* would appear to hold the developer liable either 1) where he is guilty of negligence to neighboring lands, or 2) where he collects surface waters by an artificial channel and discharges them in concentrated form or greatly increased quantities upon his neighbors. See 373 Pa. at 437, 96 A.2d at 143.

220. 381 Pa. 317, 113 A.2d 148 (1955).

221. *Id.* at 318, 113 A.2d at 148.

222. *Id.* at 319, 113 A.2d at 149.

223. *Id.*

224. *Id.* at 320, 113 A.2d at 149.

225. See *id.* at 318-19, 113 A.2d at 149.

226. See notes 218 & 222 and accompanying text *supra*.

227. 381 Pa. at 319, 113 A.2d at 149; see *Watters v. North Star Coal Co.*, 112 Pittsb. L.J. 413 (C.P. Allegheny 1964) (surface miner in rural area held liable for creating artificial low point which concentrated runoff); *Mackey v. Lubin*, 9 Chester County L. Rep. 193 (C.P. 1960) (increase of flow through natural valley 100-200 feet wide held nonactionable, but piling of dirt which broke loose found to be negligent); *Long v. Eitner Homes, Inc.*, 6 Bucks County L. Rep. 91 (C.P. 1956).

suggested that so long as the developer did nothing to control or channel storm runoff, but merely increased it to the detriment of neighbors, no liability would be found.²²⁸ Yet the court was cognizant of the "vexatious problems" arising in drainage cases under the morass of Pennsylvania drainage rules.²²⁹

The vexatiousness of those problems was amply demonstrated when the Exeter Township School Authority constructed a new large schoolhouse, surrounded by extensive impervious surfaces and athletic fields, all graded, guttered and drained for "prompt escape of rainfall."²³⁰ The county court narrowly construed the *Rau* "concentration" rule and exonerated the school authority from liability for the "bane" of flooding imposed upon adjacent homes.²³¹

*Westbury Realty Corp. v. Lancaster Shopping Center, Inc.*²³² finally stretched the Pennsylvania rules to their breaking point. The defendant's shopping center covered seventeen acres with buildings and nonpourous material in a "rural" area.²³³ Since the center lacked a sewer system, storm water flowed off in a diffused state, flooding neighboring properties and making adjacent land unsuitable for development or use.²³⁴ Neither negligence nor concentration of water in an artificial channel was alleged, but the supreme court, acknowledging the need for new attitudes, characterized the shopping center as an "artificial" land use and held that the action would lie.²³⁵ The court suggested that it was surely reasonable to

228. See 381 Pa. at 320-21, 113 A.2d at 149-50.

229. See *id.* at 321-22, 113 A.2d at 150. The court noted:

The many and large real estate developments . . . in the last ten years and the building of thousands of homes have brought to the Courts many drainage problems, both sanitary and surface water. Each problem is to some extent unique and while the basic rules of law seem to be well settled, the application of these rules to a particular case is very often a difficult matter.

Id.

230. *Herbein v. Exeter Township School Auth.*, 48 Berks County L. Rep. 137 (C.P. 1956), *aff'g* 47 Berks County L. Rep. 289 (C.P. 1955).

231. 48 Berks County L. Rep. at 138.

232. 396 Pa. 383, 152 A.2d 669 (1959). Mr. Justice Bell, who dissented, later claimed that *Westbury Realty* overruled by implication more than 20 prior decisions. See *Webb v. Zern*, 422 Pa. 424, 429 & n.2, 220 A.2d 853, 855 & n.2 (1966) (Bell, J., dissenting).

233. 396 Pa. at 385, 152 A.2d at 670.

234. *Id.* at 387-88, 152 A.2d at 672.

235. *Id.* at 388, 152 A.2d at 672. In so holding, the court stated:

Even though the shopping center is developed in a rural section, the center has all the characteristics of an urban development. This requires new attitudes, both on behalf of the developers as well as the court. While the owners of higher lands have the right to have the water flowing from their lands discharged in a natural watercourse upon the lower lands, and while the upper lands may increase the flow through the natural and reasonable use of the lands, a large shopping center development in a rural area, as in the instant case, cannot be considered a natural use of the land. It surely was not a contemplated use of the land when our concepts of water flow were developed. Rather, it is an *artificial use of the land* for which the developers must make the proper accommodation so as not to place the burden of the increased flow upon the servient tenement.

Id. (emphasis added).

require the shopping center developer to bear the relatively small cost of installing adequate drainage facilities to prevent "water drainage hardship" to others.²³⁶ In effect, the court came close to readopting the long-forgotten rule of *Bentz*.²³⁷

Few could quarrel with the court's plea for new attitudes regarding drainage problems. Unfortunately, although the majority of justices evidently desired to change the law,²³⁸ the *Westbury Realty* decision failed to announce clear new standards to guide developers or aggrieved landowners. The arbitrary classification of shopping centers as "artificial" land uses²³⁹ leaves a great deal to conjecture. Should equally large residential subdivisions, industrial parks, planned unit developments, or school complexes be treated as "artificial" or "natural and reasonable" uses of land? What difference should the purpose or type of the defendant's development make when the impact of increased runoff is injurious to neighboring lands? Why not require all those engaged in land development to take reasonable care to control drainage in order to avoid harm to others? Experience gained from development in the past century and refinement of hydrologic science has made the storm water management problems stemming from alterations of land slope, cover, and use reasonably predictable and assessable.²⁴⁰ Since steps can be taken in designing and implementing development plans to avoid or ameliorate drainage problems,²⁴¹ continued exoneration of developers from liability for the avoidable injurious consequences of their activities, based upon one-sided rules and arbitrary exceptions, hardly seems justified.

Regrettably, the supreme court's inclination toward a "new attitude" has not curtailed vexatious suits. Nor have Pennsylvania's lower courts responded to the supreme court's invitation in

236. *Id.* The complaint alleged that the problem could be remedied by an expenditure of \$9,600, an amount the court considered insignificant in light of the total investment represented by a 17-acre shopping center. *Id.*

237. See notes 55-62 and accompanying text *supra*.

238. See 396 Pa. at 389, 152 A.2d at 672 (Bell, J., dissenting).

239. See note 235 and accompanying text *supra*.

240. See note 7 *supra*.

241. See generally NORTHEAST REGIONAL TECHNICAL SERVICE CENTER, SOIL CONSERVATION SERVICE, U.S. DEP'T OF AGRICULTURE, GUIDELINES FOR THE CONTROL OF EROSION AND SEDIMENT IN URBAN AREAS OF THE NORTHEAST (1970); SOIL CONSERVATION SERVICE, U.S. DEP'T OF AGRICULTURE, ENGINEERING FIELD MANUAL FOR CONSERVATION PRACTICES ch. 2-3, 6-11, 13-16 (1969); N.J. STATE SOIL CONSERVATION COMM'N, STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY 2.1-4.74 (1972); A. O'DELL, W.A. THURBERT & T.E. FRITZ, REGIONAL STORM DRAINAGE PLAN 86-99 (1973) [hereinafter cited as O'DELL]; PA. DEP'T OF ENVIRONMENTAL RESOURCES, SOIL EROSION AND SEDIMENTATION CONTROL MANUAL (1976); PHILADELPHIA CITY PLANNING COMM'N, WISSAHICKON WATERSHED DEVELOPMENT GUIDE 7-15 (1975).

subsequent drainage cases. Although many post-1960 cases have imposed liability on developers for substantial damage created by runoff under the rubric of the artificial diversion, collection, and concentration exceptions to the common enemy rule,²⁴² decisions in the past fifteen years have perfunctorily relied upon the same anachronistic doctrines, distinctions, and aphorisms.²⁴³

Despite the Pennsylvania lower courts' reluctance to recognize or propose a more rational drainage law, the recent decision of the United States District Court for the Eastern District of Pennsylvania in *Breiner v. C & P Home Builders, Inc.*,²⁴⁴ purportedly applying state law,²⁴⁵ signifies a major advancement. The district court adjudicated a complaint instituted by farm owners in Lower Macungie Township against a developer, his engineer, and municipal officials in neighboring Alburdis Borough for negligently failing to control storm water drainage from a large home subdivision.²⁴⁶ The developer substantially increased the runoff onto the plaintiffs' farms by grading the land and filling a marshy retention area, thereby precluding the cultivation of strawberries.²⁴⁷ The court could have relied upon the unlawful collection and diversion doctrine;²⁴⁸ instead, it interpreted *Westbury Realty* and *Lucas* as imposing liability upon a mere showing that the upper landowner, by intent or negligence, unreasonably or unnecessarily increased the flow of surface water.²⁴⁹ The court readily found negligence as well as substantial evidence of intent.²⁵⁰ Since the developer in *Breiner* had

242. See notes 178-193 and accompanying text *supra*.

243. See, e.g., *St. Andrew's Evangelical Lutheran Church v. Lower Providence Township*, 414 Pa. 40, 198 A.2d 860 (1964) (municipality held liable for installation of drainage pipe artificially funneling runoff from nearby development onto church parsonage); *Conn v. Fisher*, 64 Lancaster County L. Rep. 413 (C.P. 1975) (no liability without artificial diversion or negligence); *Good v. Boorse*, 21 Chester County L. Rep. 1 (C.P. 1973) (downstream landowner who blocked drainage held not liable, since he did not obstruct a natural stream, or block diffuse surface water in a negligent fashion); *Baker v. Netherwood Corp.*, 86 Montgomery County L. Rep. 281 (C.P. 1966) (developer held not liable for collection and discharge of spring waters through pipe to "natural swale," since waters were not "diverted" from their natural course, unreasonably changed in quantity or quality, or concentrated in a manner to cause unavoidable harm to neighbors); *Watters v. North Star Coal Co.*, 112 Pittsb. L.J. 413 (C.P. Allegheny 1964) (coal company held liable for creating "artificial low point" which concentrated water); *Posey v. Billings*, 81 Montgomery County L. Rep. (C.P. 1961) (homeowner held liable for filling swale and concentrating formerly diffuse runoff); *Hall v. Tomer*, 42 Westmoreland County L.J. 41 (C.P. 1960) (subdivision developer ordered to install catch basins and eliminate water artificially diverted by streets and adjoining ditches).

244. 398 F. Supp. 250 (E.D. Pa. 1975), *aff'd in part*, 536 F.2d 27 (3d Cir. 1976).

245. 398 F. Supp. at 252.

246. *Id.* at 251.

247. *Id.* at 251-52.

248. See notes 178-193 and accompanying text *supra*.

249. 398 F. Supp. at 253.

250. *Id.*

received clear warnings from his neighbors of the potential accelerated runoff problem,²⁵¹ there was no question that the defendants should have known or could have foreseen the harm resulting from the development scheme. Although the district court's holding in favor of the adjacent farm owners was unanimously upheld by the Third Circuit,²⁵² the federal courts' liberal application of Pennsylvania case law has yet to be embraced by Pennsylvania state courts.

G. Summary of Pennsylvania Drainage Rules

At present, Pennsylvania's drainage rules can be summarized as follows:²⁵³

1. A landowner may not obstruct or divert the natural flow of a watercourse or natural drainage course to the injury of another.²⁵⁴ In urban areas, "natural drainage course" is narrowly interpreted to include only streams with well-defined channels and banks.²⁵⁵ In rural areas, the term is more broadly construed, apparently including the flow and direction of diffused surface waters.²⁵⁶

2. A landowner may, at least in urban areas, obstruct the flow of diffused surface waters not flowing in a natural watercourse, if the obstruction is conducted in a nonnegligent manner.²⁵⁷

3. A landowner may not artificially collect or concentrate unusually large quantities of diffused surface waters and discharge them onto adjoining properties.²⁵⁸

4. A landowner may not divert onto another's land runoff from an area which would not have naturally drained in that direction.²⁵⁹

5. A landowner may not unreasonably or unnecessarily change the quantity or quality of water drained in a natural channel.²⁶⁰

6. A landowner may, in the nonnegligent, "natural and reasonable" improvement of his land, increase the runoff flow of

251. *Id.*

252. *Breiner v. C & P Home Builders, Inc.*, 536 F.2d 27 (3d Cir. 1976) (developer found liable).

253. For a comparison with other states' approaches to drainage problems, see 5 WATER RIGHTS, *supra* note 12, §§ 456.1-2.

254. *Chamberlin v. Ciaffoni*, 373 Pa. 430, 436-37, 96 A.2d 140, 143 (1953); *Lucas v. Ford*, 363 Pa. 153, 155, 69 A.2d 114, 116 (1949).

255. See notes 152-160 and accompanying text *supra*.

256. See notes 114-127 and accompanying text *supra*.

257. See *Yenchko v. Grontkowski*, 385 Pa. 272, 122 A.2d 705 (1956); *Kinkle v. Ford City Borough*, 305 Pa. 416, 420-21, 158 A. 159, 160 (1932); *Taylor v. Harrison Constr. Co.*, 178 Pa. Super. Ct. 544, 115 A.2d 757 (1955); *Good v. Boorse*, 21 Chester County L. Rep. 1 (C.P. 1973).

258. *Rau v. Wilden Acres*, 376 Pa. 493, 103 A.2d 422 (1954); *Posey v. Billings*, 81 Montgomery County L. Rep. 199 (C.P. 1961); *Hall v. Tomer*, 42 Westmoreland County L.J. 41 (C.P. 1960).

259. See *Frederick v. Lansdale Borough*, 156 Pa. 613, 27 A. 563 (1893).

260. *Lucas v. Ford*, 363 Pa. 153, 155, 69 A.2d 114, 116 (1949).

diffused waters or waters drained in a natural watercourse, subject to the rules against diversion, collection, and concentration.²⁶¹

7. A landowner engaged in "artificial" improvement of his land, such as the construction of shopping centers and other large developments, must take reasonable precautions to control the discharge of accelerated runoff and protect adjoining lands from avoidable harm.²⁶²

8. Although a landowner may be held responsible for negligent modification of drainage, particularly through failure to maintain proper drainage structures,²⁶³ Pennsylvania courts have traditionally accorded deference to relatively unrestricted development of land.²⁶⁴ Few decisions involving developers and injured neighboring landowners have imposed liability based upon negligence.²⁶⁵ However, if the recent federal decision in *Breiner*²⁶⁶ is followed by state courts, the negligence test could be broadened to require all who alter drainage or accelerate runoff to take reasonable steps in the design and implementation of development projects to protect other lands and avoid increased flooding downstream — a duty not unlike that imposed by the earliest, but now abandoned or forgotten, Pennsylvania drainage cases.²⁶⁷ Unfortunately, a clear statement of such duty has yet to be announced by modern Pennsylvania decisions.

The hackneyed rhetoric of the common enemy rule lingers, confused by phrases borrowed from civil law cases. In the absence of a more thoughtful approach reflecting the realities of modern development practices, hydrologic science, and the public's interest in preventing escalation of flooding conflicts, Pennsylvania drainage law will continue to contribute to the Commonwealth's storm water management problem.

261. See *Leiper v. Heywood-Hall Constr. Co.*, 381 Pa. 317, 320, 113 A.2d 148, 149-50 (1955); *Chamberlin v. Ciaffoni*, 370 Pa. 430, 96 A.2d 140 (1953); *Herbein v. Exeter Township School Auth.*, 48 Berks County L. Rep. 137 (C.P. 1956).

262. *Westbury Realty Corp. v. Lancaster Shopping Center, Inc.*, 396 Pa. 383, 152 A.2d 669 (1959).

263. See *Yenchko v. Grontkowski*, 385 Pa. 272, 122 A.2d 705 (1956).

264. See, e.g., *Rielly v. Stephenson*, 222 Pa. 252, 256-57, 70 A. 1097, 1099 (1908).

265. Compare *Yenchko v. Grontkowski*, 385 Pa. 272, 122 A.2d 705 (1956) (negligence found in blocking drain pipe and piling dirt), and *Pfeiffer v. Brown*, 165 Pa. 267, 30 A. 844 (1895) (negligence found in disposal of waste saline water from oil well), with *Good v. Boorse*, 21 Chester County L. Rep. 1 (C.P. 1973) (no negligence found when mound of earth forced surface flow onto plaintiff's land), and *Mackey v. Lubin*, 9 Chester County L. Rep. 193 (C.P. 1960) (negligence found in constructing artificial channel to discharge greater volume of surface flow upon neighbor's property).

266. See notes 244-252 and accompanying text *supra*.

267. See notes 55-78 & 170-177 and accompanying text *supra*.

H. Remedies in Private Drainage Disputes

Assuming a landowner has pleaded and proved a valid cause of action against unlawful drainage of surface water, a variety of remedies may be available, depending upon the circumstances. An aggrieved party may be entitled to injunctive relief, damages, or self-help to abate the drainage nuisance.²⁶⁸

1. Equitable Remedies

Equitable remedies, in the form of injunctions against continuing unlawful drainage, may be granted at the court's discretion.²⁶⁹ In determining whether such relief should be granted, a number of factors are relevant, including: 1) adequacy of remedies at law; 2) irreparable nature of damages; 3) comparative benefits and costs to the plaintiff and defendant; 4) prevention of a multiplicity of law suits; 5) temporary or permanent nature of the injury; 6) whether the equitable relief requested will require "mandatory" or "affirmative" action by the defendant; 7) imminence of threatened injury; and 8) whether the injury is a continuing one.²⁷⁰

In most instances, where development of land or other action by the defendant has created an unlawful drainage condition — for example, the artificial collection and concentration of storm runoff — the injury claimed is continuing in nature. Denial of injunctive relief would result in multiple legal actions to recover the successive damages resulting from the condition. In such circumstances, Pennsylvania courts have not hesitated to grant an injunction directing the defendant to cease the illegal drainage activity.²⁷¹ Where the unlawful drainage was the temporary result of construction activities and has been corrected, injunctive relief generally will not be appropriate, although damages for the injury incurred may be available.²⁷² In addition, equitable defenses, such as "unclean hands" may bar injunctive relief.²⁷³

A close reading of the Pennsylvania cases up to 1958 suggests that the "balancing equities" factor may have led, *sub silentio*, to

268. See generally 5 WATER RIGHTS, *supra* note 12, § 458.

269. See, e.g., *St. Andrew's Evangelical Lutheran Church v. Lower Providence Township*, 414 Pa. 40, 198 A.2d 860 (1964); *Rau v. Wilden Acres*, 376 Pa. 493, 103 A.2d 422 (1954); *Culbertson v. Gross*, 77 York County L. Rec. 50 (C.P. 1962).

270. 5 WATER RIGHTS, *supra* note 12, § 548.1.

271. See, e.g., *St. Andrew's Evangelical Lutheran Church v. Lower Providence Twp.*, 414 Pa. 40, 198 A.2d 860 (1964); *Rau v. Wilden Acres*, 376 Pa. 493, 103 A.2d 422 (1954); *Lehigh & Wilkes-Barre Coal Co. v. Pittston Coal Mining Co.*, 289 Pa. 492, 137 A. 672 (1927); *Posey v. Billings*, 81 Montgomery County L. Rep. 199 (C.P. 1961).

272. See *Long v. Eitner Homes, Inc.*, 6 Bucks County L. Rep. 91 (C.P. 1956).

273. See *Snow v. D'Annunzio*, 72 Dauphin County L. Rep. 219 (C.P. 1958).

many of the seemingly arbitrary quirks of state drainage law. A typical case involved a private property owner requesting injunctive relief against an adjacent land development, often a significant residential subdivision. In judging whether an injunction should be issued, the courts balanced the harm to the defendant if the relief were granted against the injuries imposed upon the plaintiff by the drainage conditions. Unfortunately, rarely did the courts expressly articulate this consideration.²⁷⁴ In most cases, the court merely assumed that the benefits of "progress" represented by the defendant's activity outweighed harm to others, "which they [had to] accept as one of the unavoidable burdens of community, and especially urban life."²⁷⁵ Instead of properly limiting the balance of equities factor to the issue of whether to grant an injunction, the Pennsylvania courts invented a maze of distinctions and rationales to deny all relief, including the award of damages to significantly injured landowners.²⁷⁶

Where injunctive relief was found to be justified, Pennsylvania courts seldom used equitable remedies in a creative fashion. Most cases have culminated in an order merely requiring the defendant to cease unlawful drainage or unlawful collection and discharge of storm runoff. How, when, and whether this could be accomplished was not usually specified. In one dispute, however, the Westmoreland County Court was more definite; after reviewing specific alternatives proposed by the plaintiff, it ordered the defendant subdivision developer to install catch basins and drains to eliminate the discharge of runoff onto neighboring properties.²⁷⁷ Although it is certain that courts are not equipped with the facilities to design and supervise programs to alleviate storm water management problems, judicial reluctance to frame more specific relief necessitates final resolution of disputes through private agreement or subsequent litigation regarding compliance with the court's order. A requirement that the defendant submit to the court and all parties a hydrologic and engineering plan for abating the problem and establish a schedule for implementing the plan would be a preferable arrangement.²⁷⁸ If the complaining parties feel the plan is inade-

274. See *Pfeiffer v. Brown*, 165 Pa. 267, 30 A. 844 (1895); *Culbertson v. Gross*, 77 York County L. Rep. 50 (C.P. 1962).

275. *Chamberlin v. Ciaffoni*, 373 Pa. 430, 437, 96 A.2d 140, 143 (1953).

276. See, e.g., *Taylor v. Harrison Constr. Co.*, 178 Pa. Super. Ct. 544, 547, 115 A.2d 757, 759 (1955); *Herbein v. Exeter Township School Auth.*, 48 Berks County L. Rep. 137 (C.P. 1956).

277. *Hall v. Tomer*, 42 Westmoreland County L.J. 41 (C.P. 1960).

278. See *Commonwealth v. Hamm*, Cumberland County C.P., No. 1 (Jan. Term 1973) (settled by consent order).

quate or improper, at least such disputes can be resolved expeditiously before inadequate, expensive, or unnecessary action is taken.

2. Damages

Even where equitable relief is unavailable or inappropriate, compensatory damages are a possible remedy for drainage injuries.²⁷⁹ Two problems may arise in obtaining damages: proof of damage and measurement of loss. Damages may not be awarded on the basis of speculation, hypothesis, or conjecture; there must be credible evidence of loss.²⁸⁰ Moreover, the plaintiff must establish causation between the defendant's actions and the damage.²⁸¹ Even where the defendant unlawfully alters drainage patterns, the court may deny damages for injuries that were proximately caused by an extraordinary storm or flood, and not directly by the defendant's acts.²⁸²

The measurement of compensatory damages is often a difficult matter, sometimes compounded by uncertainty as to whether the intermittent or recurring injury created by drainage problems is permanent or temporary in nature. If the drainage problem could be remedied by the defendant, either voluntarily or at the court's order, the dispute might be addressed by successive damage actions, which might convince the defendant to abate the noxious condition. In contrast, where permanent compensation is awarded for all past, present, and projected injury to the plaintiff, the defendant in effect acquires an easement to continue the offending condition without further liability.²⁸³

Where permanent damages are awarded, the basic measure of compensation is the diminution in value of the affected real estate, that is, the difference in market value before and after the loss.²⁸⁴ A

279. 5 WATER RIGHTS, *supra* note 12, § 458; see *Leupold v. Hyman Korman, Inc.*, 84 Montgomery County L. Rep. 376 (C.P. 1964); *Keim v. Tyson*, 53 Westmoreland County L. Rep. (C.P. 1961); *Mackey v. Lubin*, 9 Chester County L. Rep. 193 (C.P. 1959). The test in granting injunctive relief fundamentally involves a balancing of equities, including the relative value of the defendant's activities. See RESTATEMENT (SECOND) OF TORTS § 941 (Tent. Draft No. 22, 1976). In assessing damages, the relative value of the defendant's acts should be irrelevant. Even if it has significant public value, if it unreasonably injures the property of another, compensation may be granted although an injunction might be denied. See W. PROSSER, *supra* note 54, § 90.

280. 5 WATER RIGHTS, *supra* note 12, § 458.2(B).

281. *Id.*

282. *Hall v. Tomer*, 42 Westmoreland County L.J. 41 (C.P. 1960).

283. See *Phillips v. Chesson*, 231 N.C. 566, 58 S.E.2d 343 (1950); 5 WATER RIGHTS, *supra* note 12, at 586-87 & n.90.

284. 5 WATER RIGHTS, *supra* note 12, § 458.2; see *Breiner v. C & P Home Builders, Inc.*, 398 F. Supp. 250, 259 (E.D. Pa. 1975), *aff'd in part*, 536 F.2d 27 (3d Cir. 1976); *Lucot v. Rodgers*, 159 Pa. 58, 28 A. 242 (1893); *Weir v. Plymouth Borough*, 148 Pa. 566, 24 A. 94 (1892).

lesser amount may be awarded equal to the reasonable cost of curing the condition and restoration, including costs of drains, channels, and rights-of-way across the plaintiff's land.²⁸⁵ If an injunction is granted or the offending condition is abated before completion of the suit, damages may be awarded only for the period of injury.²⁸⁶ Such damages may be measured on the basis of reduced rental value while the damage continued,²⁸⁷ or the costs of restoring the injured property to its original condition.²⁸⁸

3. *Self-Help*

The right of a landowner to protect his property against a nuisance by "self-help" abatement is recognized under common law.²⁸⁹ The self-help right permits the correction of the *unlawful* condition *without breach of the peace*. If an owner can erect upon his own property a barrier to unlawful drainage without trespass upon the lands of another, self-help may be available.²⁹⁰ Trespassory self-help, however, is strongly discouraged.²⁹¹

The self-help remedy in Pennsylvania is hopelessly confused with the common enemy rule allowing landowners — at least in urban areas — to block out surface water drainage even though the natural or increased flow from above is *lawful*.²⁹² Only in *In re Limerick & Colebrookdale Turnpike Co.*²⁹³ was self-help properly applied to allow abatement of a clearly unlawful discharge of accelerated runoff. In most other cases, the courts have condoned, if not encouraged, a neighborhood contest of pipes and dikes in which breach of the peace is an inevitable result.²⁹⁴

II. SPECIAL RULES FOR STATE FACILITY DRAINAGE

Like modern shopping and residential developments, state highways and other facilities often have a significant effect upon the

285. *Breiner v. C & P Home Builders, Inc.*, 398 F. Supp. 250, 259 (E.D. Pa. 1975), *aff'd in part*, 536 F.2d 27 (3d Cir. 1976); *Lucot v. Rodgers*, 159 Pa. 58, 28 A. 242 (1893); *Leupolf v. Hyman Korman, Inc.*, 84 Montgomery County L. Rep. 376 (C.P. 1964); *see Battisto v. Perkins*, 210 Md. 542, 124 A.2d 288 (1965).

286. *Weir v. Plymouth Borough*, 148 Pa. 566, 24 A. 94 (1892); *Mackey v. Lubin*, 9 Chester County L. Rep. 193 (C.P. 1959); *Allen v. Woodhaven Constr. Co.*, 75 Montgomery County L. Rep. 120, (C.P. 1959); *Long v. Eitner Homes, Inc.*, 6 Bucks County L. Rep. 91 (C.P. 1956) (*dicta*).

287. *Chesarone v. Pinewood Builders, Inc.*, 345 Mass. 236, 186 N.E.2d 712 (1965); *see McCartney v. Philadelphia*, 22 Pa. Super. Ct. 257 (1903).

288. *Mackey v. Lubin*, 9 Chester County L. Rep. 193 (C.P. 1959).

289. 5 WATER RIGHTS, *supra* note 12, § 458.4; *see W. PROSSER, supra* note 54, § 90.

290. *In re Limerick & Colebrookdale Turnpike Co.*, 80 Pa. 425 (1876).

291. *See Davies v. Shaffer*, 58 Lackawanna Jur. 73 (C.P. 1956); 5 WATER RIGHTS, *supra* note 12, § 458.3.

292. *See, e.g., Taylor v. Harrison Constr. Co.*, 178 Pa. Super. Ct. 544, 115 A.2d 757 (1955); *Good v. Boorse*, 21 Chester County L. Rep. 1 (C.P. 1973).

293. 80 Pa. 425 (1876); *see* notes 105-108 and accompanying text *supra*.

294. *Maloney & Plager, supra* note 35, at 78.

quantity, velocity, direction, and quality of storm water runoff. Since such projects are undertaken by the Commonwealth, special constitutional, statutory, and judicial rules are applicable to the resolution of drainage conflicts with neighboring lands.

Traditionally, Pennsylvania's liability for damage to lands adjoining Commonwealth projects has been narrowly construed. While the Pennsylvania Constitution requires "municipal and other corporations" vested with eminent domain powers to make just compensation for "property taken, injured or destroyed by the construction or enlargement of their works, highways or improvements,"²⁹⁵ state liability extends only to property "taken or applied to public use."²⁹⁶ Thus, unless otherwise provided for by statute, the Commonwealth has no obligation to compensate for consequential damages occasioned by state projects when property is not actually taken.²⁹⁷ Over the years, a number of cases have held that alteration of drainage patterns, causing flooding of lands adjacent to state projects, does not constitute a taking of property, and may be actionable only where the Commonwealth has statutorily consented to compensate for the resulting "consequential" injury.²⁹⁸

A few circumscribed statutes explicitly provide for compensation of consequential drainage damages by the Commonwealth. For example, section 417 of the State Highway Law (Highway Law)²⁹⁹ authorizes the Pennsylvania Department of Transportation (PennDOT) to "enter upon any lands . . . and cut, open, maintain, and repair such drains or ditches, inlets or outlets . . . as are necessary to carry the waters from . . . highways . . . constructed or improved at

295. PA. CONST. art. 10, § 4.

296. *Id.* art. 1, § 10.

297. *See, e.g.,* *Ewalt v. Pennsylvania Turnpike Comm'n*, 382 Pa. 529, 534, 115 A.2d 729, 731 (1955); *Heil v. Allegheny County*, 330 Pa. 449, 453, 199 A. 341, 343 (1938). The law in Pennsylvania has been summarized as follows:

It is well established that acts not done in the exercise of the right of eminent domain and not the immediate, necessary or unavoidable consequence of the right, cannot be the basis of any claim in that proceeding. . . . No recovery can be had in an eminent domain proceeding where one's injuries result from a trespass.

. . . . By the same token, a de facto taking cannot result from negligent acts committed by agents of the body charged with the power of eminent domain. *In re Condemnation of 2719, 2721, & 2711 E. Berkshire St.*, 20 Pa. Commw. Ct. 601, 605, 343 A.2d 67, 69 (1975) (citations omitted).

298. *Ewalt v. Pennsylvania Turnpike Comm'n*, 382 Pa. 529, 115 A.2d 729 (1955) (liability for erosion damage based on statute); *Heid v. Allegheny County*, 122 Pa. Super. Ct. 312, 186 A. 215 (1936) (compensation for drainage damage denied); *New York Cent. R.R. v. Venango County*, 105 Pa. Super. Ct. 245, 161 A. 488 (1932) (compensation for drainage damage denied); *Commonwealth Dep't of Transp. v. Palmer Township*, 16 Pa. Commw. Ct. 270, 329 A.2d 871 (1974) (liability for drainage damage ruled outside statutory provision, compensation denied); *see West Branch & Susquehanna Canal Co. v. Mulliner*, 68 Pa. 357, 360 (1871) (Commonwealth not liable for damages caused when raised canal water flooded adjacent land and home).

299. PA. STAT. ANN. tit. 36, § 670-417 (Purdon 1961).

the expense of the Commonwealth or under its supervision.”³⁰⁰ Any damage incurred by landowners whose property is “entered upon by the department [PennDOT] for such purposes” is recoverable under the eminent domain provisions of the Highway Law.³⁰¹ Surprisingly, since adoption of this provision in 1945,³⁰² Pennsylvania courts have not been called upon to interpret its substantive application to drainage disputes. However, on the basis of the distinction between consequential damages and a taking of property, at least one court has narrowly construed language nearly identical to section 417, contained in a prior highway act.³⁰³ The Superior Court of Pennsylvania in *Heid v. Allegheny County*³⁰⁴ ruled that, absent physical entry by the highway agency onto private lands to install drains, no liability could be imposed on the Commonwealth.³⁰⁵ The courts have not awarded damages to injured property owners where the state merely installs a gutter on a road right-of-way to collect and divert the surface water and release it at the boundary line of a private owner.³⁰⁶ While a municipality could be held liable in trespass for damages caused by similar road improvements which diverted storm water from its natural course,³⁰⁷ no legislative authority existed to impose a similar responsibility on the Commonwealth.³⁰⁸

Since the *Heid* case, legislative reform of the Eminent Domain Code (Code)³⁰⁹ has, at least partially, expanded the Commonwealth’s liability for consequential damage claims in highway cases. Section 612 of the Code provides that, where drainage is altered by the change of highway grade and damages abutting property, the Commonwealth must provide just compensation.³¹⁰ Yet, this language also has received a narrow interpretation by Pennsylvania courts. The state, for example, is not required to compensate for

300. *Id.*

301. *Id.*

302. Act of June 1, 1945, No. 428, § 417, 1945 Pa. Laws 1242.

303. Act of April 29, 1925, No. 212, §§ 1, 3, 1925 Pa. Laws 360, as amended by Act of April 10, 1929, No. 195, § 1, 1929 Pa. Laws 477.

304. 122 Pa. Super. Ct. 312, 186 A. 215 (1936).

305. *Id.* at 318, 186 A. at 217.

306. *Id.* at 317, A. at 217; see *New York Cent. R.R. v. Venango County*, 105 Pa. Super Ct. 245, 161 A. 488 (1932).

307. See 122 Pa. Super. Ct. at 314-15, 186 A. at 216 (1936), citing *Yocum v. Union Township*, 98 Pa. Super. Ct. 540 (1929). See also notes 325-351 and accompanying text *infra*.

308. See 122 Pa. Super. Ct. at 318, 186 A. at 216 (1936).

309. PA. STAT. ANN. tit. 26, §§ 1-101 to 1-903 (Supp. 1975).

310. *Id.* § 1-612. Section 612 of the Code states: “All condemnors, including the Commonwealth of Pennsylvania, shall be liable for damages to property abutting the area of an improvement resulting from change of grade of a road or highway, permanent interference with access thereto, or injury to surface support, whether or not any property is taken.” *Id.*

damages caused by highway drainage alterations to municipal roads and lands which do not actually abut the state project.³¹¹ Thus, if an alteration of a highway grade causes drainage to flow across A's abutting strip of land, from whence it flows onto properties of B, C, and D, thereby causing significant injury to their homes and lands, the Commonwealth would be obligated to compensate A only.

Moreover, it should be noted that section 612 applies only to drainage damages caused by highway grade changes. Installation of road drains, without entry onto adjacent properties or a grade change, is not covered, nor is drainage from nonhighway facilities. Although specific project enabling acts may potentially authorize compensation for damage caused by state facility drainage, no other statutes have been found which generally address the issue of recovery for such injuries.

While the Commonwealth asserts a privilege to alter drainage to the detriment of neighboring downslope lands with only limited liability, it imposes more stringent restrictions on the right of property owners to drain across or through state facilities. In addition to the normal rights of a landowner regarding drainage from upslope properties,³¹² state statutes provide special drainage controls to protect Commonwealth projects. The Highway Law, for example, prohibits any landowner from filling up, injuring, diverting, or changing the course of any highway drain or ditch without PennDOT permission.³¹³ Under provisions allowing PennDOT to regulate highway use,³¹⁴ policies have been adopted restricting the utilization of highway drainage facilities by upper landowners in order to protect the capacity of such drains and avoid injury to roads.³¹⁵

The continued viability of the current rules governing drainage from Commonwealth facilities is, at best, questionable. Particularly troublesome are the metaphysical distinctions between consequen-

311. Commonwealth Dep't of Transp. v. Palmer Township, 16 Pa. Commw. Ct. 270, 329 A.2d 871 (1974). If, however, a *municipality* had caused the same damage while constructing a road, it would have been held fully liable, regardless of whether the injured property abutted the highway right-of-way. This liability is based on the rule that a municipality engaged in a highway or other project which materially affects drainage and is sufficiently near to private lands to make the injury proximate, immediate and substantial, will be required to pay just compensation. *In re Chatham St.*, 191 Pa. 604, 605-06, 43 A. 365, 365 (1899).

312. See notes 194-252 and accompanying text *supra*.

313. PA. STAT. ANN. tit. 36, § 670-417 (Purdon 1961).

314. *Id.* § 670-420.

315. PA. DEP'T OF TRANSPORTATION, DEP'T OF HIGHWAYS, RULES AND REGULATIONS, ch. 1 (1969); PA. DEP'T OF TRANSPORTATION, DRAINAGE REPORT (Circ. Letter No. E-2132, Oct. 25, 1974).

tial drainage damages, for which no compensation is necessary, and the entering and taking of property, for which just compensation is required;³¹⁶ and the dichotomy between abutting and nonabutting lands.³¹⁷ As the superior court noted forty years ago in *Heid*, where the Commonwealth alters drainage, collects, concentrates, and discharges the flow of storm water across a citizen's lands, the property owner "has a real grievance and should be given relief"³¹⁸ It is difficult to argue that, where drainage from state facilities destroys crops, floods fields and structures, or erodes channels across private properties, the resulting damage is consequential and not an unconstitutional taking of lands without compensation. Although some Pennsylvania courts have adhered to the restricted and often contorted concepts of Commonwealth liability for property damage³¹⁹ requiring an actual entry and taking or a statutory allowance of consequential damages, this position has been significantly undermined by evolving doctrines of inverse condemnation under the Federal Constitution. The test of taking under the fifth and fourteenth amendments rests upon whether the owner is substantially deprived of the beneficial use and enjoyment of property.³²⁰ Physical entry by a government agent is not required to find inverse condemnation. Just as aircraft noise in the vicinity of a government airport can "take" a noise easement, storm runoff from state and local projects diverted across citizens' lands without appropriate controls can "take" a drainage easement.³²¹ The Commonwealth should not be able to constitutionally escape liability by terming the deprivation a "consequential damage." The duty to pay just compensation flows from the state's action in substantially injuring private property, partially or totally depriving an owner of the beneficial use of his land, and not from artificial labels applied to the mode of injury.³²² To the extent that much of Pennsylvania drainage law, as applied to Commonwealth projects, rests upon such labels, it must be deemed frail indeed.

The weakness of the traditional, artificial rules seems to have been recognized by the most active state agencies. Both PennDOT and the Department of Environmental Resources (DER), in conduct-

316. See notes 295-308 and accompanying text *supra*.

317. See notes 309-311 and accompanying text *supra*.

318. 122 Pa. Super. Ct. at 318; 186 A. at 217.

319. See, e.g., *In re Condemnation of 2719, 2721 & 2711 E. Berkshire St.*, 20 Pa. Commw. Ct. 601, 343 A.2d 67 (1975); *Commonwealth Dep't of Transp. v. Palmer Township*, 16 Pa. Commw. Ct. 270, 329 A.2d 871 (1974).

320. *Griggs v. Allegheny County*, 369 U.S. 84 (1962); *United States v. Causby*, 328 U.S. 256 (1946).

321. *Capristo v. Commonwealth*, 58 Pa. D. & C.2d 715, 718-20 (C.P. Luzerne 1972).

322. *Id.*

ing highway, park, and mine restoration projects, have recently pursued more positive programs to prevent drainage conflicts with neighboring properties.³²³ When conflicts arise, both agencies have tended to settle the disputes without extended litigation, generally accepting a duty to dispose of drainage in the same manner legally expected of any nongovernmental entity. Pennsylvania law, however, is not yet as progressive as the attitude of some executive agencies, and citizens have no legal guarantee that their particular dispute will be resolved amicably. Unless the Commonwealth's statutory or case law is modified, the rights of Pennsylvania property owners will remain dependent upon executive goodwill.

III. MUNICIPAL POWERS AND RESPONSIBILITIES FOR STORM WATER MANAGEMENT

Perhaps no more confusing area of drainage law exists than that related to municipal authority and responsibility for storm water management. Municipalities³²⁴ may act in a variety of ways that directly or indirectly affect drainage. They may proceed as public land developers, grading and paving streets and constructing public schools or other facilities. They may also serve as proprietors of storm sewer or flood control projects. Local governments may function simultaneously as planning and regulatory bodies, reviewing and approving private development plans in accordance with state statutes and local ordinances. Different duties to the public and private landowners arise from each of these activities. The complications resulting from the changing doctrines of governmental and sovereign immunity and the special problems of appropriate remedies and procedures to correct grievances against local governmental units further confuse the responsibility and power of municipalities for storm water management. This section will attempt both a functional and historical analysis of the municipal role in storm water management, concluding with a discussion of some exemplary municipal efforts in this field.

323. See Interview with James J. Kutz, Assistant Attorney Gen., Pennsylvania Dep't of Transp. (July 22, 1976); Interview with John Carroll and Gary Martin, Assistant Attorneys Gen., Bureau of Legal Services, Pa. Dep't of Environmental Resources (July 26, 1976).

324. The term "municipalities," for the purposes of this section, includes counties, cities, boroughs and townships, as well as single-purpose municipal corporations such as school districts and municipal authorities. See PA. CONS. STAT. ANN. tit. 1, § 1991 (Supp. 1976).

A. *Municipal Responsibility for Drainage from Public Facilities*

Municipalities are authorized to execute a wide variety of public improvements,³²⁵ including the grading and paving of streets, installation of bridges, and construction of schools, all of which may accelerate or alter storm water runoff. Quite often these projects are extensive and cumulative in nature, and have a serious effect upon drainage patterns and neighboring lands. The quantity of litigation over such public improvements reflects the scope and seriousness of the impact of municipal activities upon storm water management.

The common law rules applicable to runoff from public facilities parallel private drainage law doctrines. The Pennsylvania Supreme Court's opinion in *Strauss*³²⁶ provides the broadest reading of the common enemy rule as applied to municipal projects. The plaintiff, the owner of a mill located just outside Allentown's city limits, complained that the paving, opening, and enlargement of streets, installation of gutters and drains, and building of residential and commercial structures had prevented rainfall from entering the ground and greatly increased the volume and force of the runoff.³²⁷ The city, however, had not "diverted" the water by "artificial channels." Debris was carried onto the plaintiff's property, a deep gully washed out, and the value of the mill property greatly depreciated.³²⁸ Following the best traditions of *Sanderson*,³²⁹ the supreme court denied relief, holding that, absent negligence, municipalities are not liable for disturbances of surface drainage caused by municipal improvements.³³⁰ Although the Pennsylvania Constitution guarantees compensation by municipal corporations for the "taking or injury" of private property for a public purpose,³³¹ the court ruled that the "constitutional provision with reference to

325. See, e.g., PA. STAT. ANN. tit. 53, §§ 1081-1101, 1371-1375, 1671-1681, 2501-2510, 3181-3195 (Purdon 1974) (general municipal law). Specific provisions are also contained in the First Class City Code, *id.* §§ 12101-21714, the Second Class City Code, *id.* §§ 22101-26116, the Third Class City Code, *id.* §§ 30101-30795, the Borough Code, *id.* §§ 45101-48501, the First Class Township Code, *id.* §§ 55101-58502, and the Second Class Township Code, *id.* §§ 65101-67201.

326. See notes 143-145 and accompanying text *supra*.

327. 215 Pa. at 97, 63 A. at 1073.

328. *Id.*

329. See notes 139-142 and accompanying text *supra*.

330. 215 Pa. at 98-99, 63 A. at 1073-74. In so holding, the court stated:

Cities are authorized to open, grade and improve streets and the abutting lot owners may build according to their requirements. In this natural change and development from agricultural or rural to urban territory some disturbance of the surface drainage is inevitable, but without negligence the municipality is not liable for the results. . . . Though a city may be authorized to construct sewers or an adequate system of drainage it is not bound to do so, nor is it liable for an erroneous judgment as to what will be adequate.

Id. (citations omitted).

331. PA. CONST. art. 10, § 4.

property 'injured' in the construction of public works, has made no change in the principles applicable to this case"³³² Unless the municipality was liable pursuant to Pennsylvania drainage rules, any injury to others was *damnum absque injuria*.

According to the doctrines derived from *Strauss* and its progeny, a local government generally will not be liable for increased runoff occasioned by the nonnegligent "natural and proper development of a municipality"³³³ or construction of public facilities.³³⁴ Yet, a municipality may not increase the volume of water draining in a particular direction,³³⁵ or accumulate and divert runoff from its natural course and "throw a body of water upon the property of one of its citizens which would not naturally have flowed there."³³⁶ The distinction between unlawful collection and diversion and lawful improvement of streets and drains can be very vague.³³⁷ In addition, a municipality may not obstruct the natural watercourse of a drainageway which has, through long use, become a prescriptive easement.³³⁸ However, the courts have narrowly confined the application of the "obstruction of a watercourse" rule to streams with defined bed and banks. For example, the court in *Kunkle v.*

332. 215 Pa. at 99, 63 A. at 1074, citing *Pennsylvania R.R. v. Marchant*, 119 Pa. 541, 13 A. 690 (1888); accord, *Stork v. City of Philadelphia*, 195 Pa. 101, 45 A. 678 (1900).

333. 215 Pa. at 99, 63 A. at 1073.

334. See *Herbein v. Exeter Township School Auth.*, 48 Berks County L. Rep. 137 (C.P. 1956), *aff'g* 47 Berks County L. Rep. 289 (C.P. 1955) (school athletic fields and parking lots accelerated runoff).

335. See *Frederick v. Lansdale Borough*, 156 Pa. 613, 27 A. 563 (1893). *But see* *Kunkle v. Ford City Borough*, 316 Pa. 571, 574-75, 175 A. 412, 413 (1934) (suggestion in dicta that municipality would be permitted to enlarge area of watershed or change flow of surface water as a consequence of gradual and ordinary development).

336. *Torrey v. City of Scranton*, 133 Pa. 173, 180, 19 A. 351, 351 (1890); accord, *Mitchell v. City of New Castle*, 275 Pa. 426, 119 A. 485 (1923) (obstruction of drainage flowing down street onto plaintiff's land); *Elliott v. Oil City*, 129 Pa. 570, 18 A. 553 (1889) (increased runoff from hillside channeled through culvert under road); *Huddleston v. Borough of West Bellevue*, 111 Pa. 110, 2 A. 200 (1885) (gutter adjoining road collected water and bypassed natural drains to river until it was apt to become a destructive flood); *Menninchino v. City of New Castle*, 96 Pa. Super. Ct. 405 (1929) (city erected barrier against water flowing down steep street, diverting runoff onto plaintiff's land); *Rohrer v. Harrisburg*, 20 Pa. Super. Ct. 543 (1902) (city constructed path across road which dammed up drainage and diverted water onto adjoining land).

337. See *Barrett v. Minersville Borough*, 38 Pa. Super. Ct. 76 (1909) (borough which installed gutter to carry runoff from street to township line and discharge it onto plaintiff's land, held not liable even though less water would have flowed onto plaintiff's lot if no gutter had been constructed).

338. *Mitchell v. City of New Castle*, 275 Pa. 426, 119 A. 485 (1923); *Rohrer v. Harrisburg*, 20 Pa. Super. Ct. 543 (1902). *But see* *Lorah v. Amity Township*, 35 Pa. Super. Ct. 529 (1908) (ditch along road for 30 years did not become prescriptive drainage path for runoff from the highway, as adjoining landowner had no claim to require its continued use and no adverse possession or use of the channel); *Schweriner v. Philadelphia*, 35 Pa. Super. Ct. 128 (1907) (city held not liable in negligence for drainage from a park improvement, even though a natural watercourse was altered by the project, where remedy of board of review not followed).

Ford City Borough,³³⁹ relied upon the common enemy rule to uphold a municipality's right to fill a drainageway between two swamps, even though it caused water to accumulate on neighboring lands. The court found that the path only discharged diffused drainage during heavy rains and was not a "stream;" thus the municipality was empowered to obstruct the runoff from higher lands.³⁴⁰

While municipalities are not liable for nonnegligent alterations in drainage patterns due to public improvements, a question arises as to the extent of local government responsibility for "negligent" acts in conjunction with such projects. Early cases created a curious distinction between negligence in the design of public improvements and negligence in their execution. This dichotomy resulted in part from a pattern of procedural ping-pong developed in litigation against local governments.

Typically, if a citizen sued in trespass and complained that damages resulted from negligent design of a municipal facility for failing to provide for drainage, the courts ruled that the government had no obligation to grade streets, install gutters, or provide for storm runoff.³⁴¹ Since selection of the optimal plan of public improvement is a matter of municipal discretion, negligence in design was not cognizable.³⁴² If the damage arose as a direct and necessary consequence of the plan selected, the proper and exclusive remedy was to request appointment of a board of review and demand compensation under the eminent domain laws.³⁴³

If landowners sued for eminent domain relief, however, they faced the rule of *Strauss* which limited recovery to collection and diversion of surface waters or *negligent* alteration of drainage.³⁴⁴ In order to recover, the claim for consequential drainage damage had to be asserted at the time of the original taking, quite probably before major storm water problems were observed and assessed. Moreover, only direct, immediate, and unavoidable consequences of a public project could be redressed through eminent domain; injuries caused by negligent performance of the authorized work had to be remedied

339. 316 Pa. 571, 175 A. 412 (1934). See *Kunkle v. Ford City Borough*, 305 Pa. 416, 158 A. 159 (1932).

340. 316 Pa. at 576, 175 A. at 161. *But see* *Burdsall v. Lansdowne Borough*, 68 Pa. Super. Ct. 215 (1917) (damages for accumulations of water resulting from public works may be awarded even where there was "no change or diversion of the watershed").

341. See, e.g., *Schweriner v. Philadelphia*, 35 Pa. Super. Ct. 128 (1907).

342. See *id.* at 131.

343. See *Robinson v. Norwood Borough*, 27 Pa. Super. Ct. 481 (1905), *aff'd*, 215 Pa. 375, 64 A. 539 (1906); *Cooper v. Scranton City*, 21 Pa. Super. Ct. 17, 19-20 (1902); *Hoster v. City of Philadelphia*, 12 Pa. Super. Ct. 224 (1899).

344. For a discussion of the *Strauss* rule, see notes 143-145, 326-332 and accompanying text *supra*.

by a tort action in trespass.³⁴⁵ The possibility of adopting a different plan that would not injure the complaining parties was not a ground for finding that the damages were avoidable. Plaintiffs were continuously confronted with the difficult task of determining the cause of their injury: Was it a natural consequence of the plan or a result of negligent performance? The dividing line between negligent design and negligent construction was often unclear.³⁴⁶ Frequently the harm stemmed from the operation of both factors, and in the confusion of multiple litigation both claims were often denied.³⁴⁷

The usual consequence of these procedural intricacies and doctrinal gymnastics was denial of relief where municipal projects created storm water problems. Only when a local government collected and diverted water, or was clearly negligent in maintaining or constructing a project, would it be held liable. The Pennsylvania cases, however, deny the existence of any duty to take reasonable care in planning public improvements in order to avoid damages to private property and erect monumental barriers to recovery for the negligent design of municipal projects. With the abolition of governmental immunity to suits for tortious conduct,³⁴⁸ it is questionable whether such arbitrary doctrines and distinctions should still prevail.

Further complications are present when two municipalities are involved in projects that create or exacerbate a drainage problem. If one municipality blocks drainage entering from a neighboring township, causing it to flood a private citizen's land, the upslope municipality will not be held responsible unless it has consented to the diversion.³⁴⁹ If the upslope community collects and discharges water into an adjoining municipality which receives it without objection, the lower municipality accepts responsibility for correctly disposing of the drainage flow and the originating community is relieved of responsibility.³⁵⁰ However, where both municipalities engage in improvements that accelerate and divert runoff, they may be considered joint and several tortfeasors, collectively and individually responsible to provide compensation.³⁵¹ Application of these

345. Chatham St., 16 Pa. Super. Ct. 103, 108-09 (1901).

346. *Compare* Barrett v. Minersville Borough, 38 Pa. Super. Ct. 76, 81 (1909), *with* Allentown v. Kramer, 73 Pa. 406, 409 (1873).

347. *See, e.g.*, Hoster v. City of Philadelphia, 12 Pa. Super. Ct. 224 (1899) (evidence of water damage excluded in eminent domain action and negligence suit dismissed because damages should have been assessed in eminent domain proceeding).

348. Ayala v. Philadelphia Bd. of Pub. Educ., 453 Pa. 584, 305 A.2d 877 (1974); *see* notes 371-374 and accompanying text *infra*.

349. Mitchell v. City of New Castle, 275 Pa. 426, 430, 119 A. 485, 486 (1923).

350. Robino v. North Sewickley Township, 48 Pa. Super Ct. 68, 72 (1911).

351. *See* Huddleston v. Borough of West Bellevue, 111 Pa. 110, 123, 2 A. 200, 204 (1885).

principles to modern cases could generate a litigious morass, as several municipalities in a watershed, all engaged in drainage alteration, debate over who contributed to or acquiesced in exacerbation of runoff problems and flooding damage to landowners throughout the basin.

B. *Municipal Responsibility for Storm Water Drainage Systems*

A number of statutes authorize counties, cities, boroughs, and townships to design, install and maintain storm sewer, drainage and flood control works.³⁵² Although these laws were drafted at various times and utilize differing language, they generally allow municipalities to expend funds to lay out drains, acquire necessary lands by purchase or eminent domain, engage in stream clearance projects, install storm sewers, channels, levees and dikes, and operate such works. The question thus arises as to what responsibilities a municipality has in the design, construction, and maintenance of storm drainage systems.

This issue arose as early as 1860 in *Carr v. Northern Liberties*.³⁵³ The community had constructed a culvert during the years 1830 to 1832 to drain its lands. Although adequate when originally installed, the culvert was rendered entirely inadequate because of subsequent development.³⁵⁴ As a result, a dry goods store and adjacent lands were repeatedly flooded by backwater from the drain inlets.³⁵⁵ The Pennsylvania Supreme Court determined that the municipality had no obligation to construct adequate sewers to serve the town's drainage needs.³⁵⁶ Therefore, since the authority to provide storm sewers was discretionary, the court held that no legal duty could be imposed upon the community.³⁵⁷ The court further suggested that, in

352. See PA. STAT. ANN. tit. 16, §§ 1947, 5147 (Purdon 1956 & Supp. 1975) (counties authorized to engage in stream improvements and storm water drainage projects); *id.* tit. 53, §§ 2201-2361 (Purdon 1974) (installation of sewers and drains); *id.* § 2862 (Purdon 1974) (municipal flood control works); *id.* § 12263 (Purdon 1957) (first class city drainage authority, superceded by Home Rule Charter); *id.* §§ 23139, 23169 (Purdon 1957) (second class city power to establish and change watercourse and construct flood control works); *id.* §§ 37403(14), 37801, 38001, 38401 (Purdon 1957) (third class city power to alter watercourses and construct flood control works and drains); *id.* §§ 46801-46802, 47201-47204 (Purdon 1959) (borough powers); *id.* §§ 57401-57445 (Supp. 1975) (first class township powers); *id.* §§ 66501-66545 (Purdon 1957 & Supp. 1975) (second class township powers); *id.* tit. 32, §§ 653-74, 701-06 (Purdon 1967) (state and local cooperation in flood and stream improvement projects).

353. 35 Pa. 324 (1860).

354. *Id.* at 325.

355. *Id.*

356. *Id.* at 328, 330.

357. *Id.* at 330. It should be noted that all current statutory provisions authorizing municipal flood control and drainage projects, like the statutory authority cited in *Carr*, are written as nonmandatory powers. See note 352 *supra*.

deference to the discretionary power of the town council, the negligent performance of the council's authority in laying out and constructing drains would also be nonactionable.³⁵⁸ Subsequent cases consistently held that no duty could be imposed upon a municipality to design and construct adequate storm drains,³⁵⁹ nor to exercise "the best" engineering judgment to select a drainage plan which would minimize injury to its citizens.³⁶⁰ These decisions rest in part, if not primarily, upon the fundamental premise of governmental immunity: that local governments may not be held liable for tortious conduct in the performance of "discretionary" or "governmental" powers, as opposed to "ministerial" or "proprietary" authority.³⁶¹

Before the abandonment of the governmental immunity doctrine,³⁶² the Pennsylvania drainage cases developed a checkerboard of distinctions and exceptions to that doctrine. For example, while a

358. *Id.* at 329. In reaching the conclusion that no action would lie for the council's negligence in storm water management, the court noted:

[T]here must be many evils, and even many wrongs, for which there can be no remedy. . . . [Public] officers are sure to make mistakes, and sometimes to cause great damage to individuals; yet the people cannot be made answerable for this before the courts, except only in some special cases. . . .

Municipal corporations have often been held liable for carelessness in the exercise of their functions; but if we undertake to correct the evil in such a case as this, on the ground of carelessness, we see not how to escape from the necessity of submitting the propriety of all acts of grading and draining in our towns, to the decision of juries; for even discretionary acts may be charged to have been ignorantly or carelessly resolved upon.

Id.

359. *E.g.*, *Aron v. Philadelphia*, 310 Pa. 84, 164 A. 777 (1933); *Collins v. City of Philadelphia*, 93 Pa. 272 (1880); *Fair v. City of Philadelphia*, 88 Pa. 309 (1879); *Diklich v. Johnstown*, 118 Pa. Super. Ct. 283, 180 A. 41 (1935); *Herr v. Altoona*, 31 Pa. Super. Ct. 375 (1906). In *Aron*, the court stated: "It is well established that there is no liability on the part of a municipal corporation for the flooding of private property from the mere inadequacy of gutters, drains, culverts or sewers." 310 Pa. at 90, 164 A. at 779. Similarly, in *Fair*, the court held that the expansion of an artificial sewer which overtaxed the capacity of the existing sewer was nonactionable, noting: "So long as it is the mere omission, as here, of the authorities, to provide adequate means to carry off the water which storms, and the natural formation of the ground, throw on a lot, the owner thereof cannot sustain an action against the municipality." 88 Pa. at 311.

360. *Diklich v. Johnstown*, 118 Pa. Super. Ct. 283, 180 A. 41 (1935); *Schroeder v. Borough of Mechanicsburg*, 74 Pa. Super. Ct. 532, 537 (1920). The superior court in *Schroeder* noted: "[A municipality] might be called upon to answer for negligence in the actual work of construction, or for failure to keep the work in repair after it is completed, but not for lack of judgment in the selection of a plan." *Id.*

361. See Phillips, *Legal Position of Local Units of Government in Pennsylvania*, 13 TEMP. L.Q. 466 (1939); Schulz, *The Liability of Municipal Corporations for Torts in Pennsylvania*, 40 DICK. L. REV. 137 (1936); Sherman, *Torts*, 19 U. PITT. L. REV. 372, 386 (1958); Note, *Municipal Tort Liability in Pennsylvania — Checkered Immunity*, 100 U. PA. L. REV. 92 (1951).

362. In 1973, the Pennsylvania Supreme Court abolished the doctrine of governmental immunity with respect to local governments in the Commonwealth. *Ayala v. Philadelphia Bd. of Pub. Educ.*, 453 Pa. 584, 305 A.2d 877 (1973). See notes 371-374 and accompanying text *infra*.

municipality would not be liable for the design of inadequate sewers, it could be held legally accountable for the installation of an inadequate culvert or sewer which obstructed the flow of a "live, natural stream" having well-defined banks and bed.³⁶³ A water-course which a municipality enclosed in a storm drainage structure had to be reasonably designed to carry the flow of the stream, even in times of "ordinary flood."³⁶⁴ Similarly, a municipality was held liable for artificial collection and discharge of surface runoff "in a body" upon private land;³⁶⁵ negligent construction of drainage systems contrary to plans or in an unworkmanlike fashion,³⁶⁶ and negligent failure to inspect, maintain and remove debris from storm sewers, culverts and other water structures.³⁶⁷ Indeed, one case suggested that there was a "line of demarcation between discretionary and mandatory construction of drainage systems by a municipality . . . determined by the volume of flow and discharge of surface water in each instance."³⁶⁸ Where, for example, surface water flows in a large volume over a highway so as to endanger travelers, the city may be charged with negligence in failing to provide proper drainage.³⁶⁹ However, existence of a set of conditions which would give rise to a municipal duty to install drainage systems was exceedingly rare.³⁷⁰

In 1973, the Pennsylvania Supreme Court finally abolished the doctrine of governmental immunity as applied to local govern-

363. See *Lang v. Punxsutawney Borough*, 44 Pa. Super. Ct. 171, 176 (1910) (Morrison, J., concurring); *Metzgar v. Lycoming Township*, 39 Pa. Super. Ct. 602, 607-10 (1909); *Gift v. City of Reading*, 3 Pa. Super. Ct. 359 (1897).

364. See *Lang v. Punxsutawney Borough*, 44 Pa. Super. Ct. 171, 176 (1910) (Morrison, J., concurring); *Metzgar v. Lycoming Township*, 39 Pa. Super. Ct. 602, 607-10 (1909).

365. *Morton v. Dormont Borough*, 334 Pa. 283, 5 A.2d 803 (1939); *Weir v. Plymouth Borough*, 148 Pa. 566, 24 A. 94 (1892); see notes 146-61 and accompanying text *supra*.

366. *Vanderslice v. City of Philadelphia*, 103 Pa. 102 (1883) (sewer allegedly improperly cradled and supported, and negligently maintained); *Gift v. City of Reading*, 3 Pa. Super. Ct. 359, 364 (1897). In *Gift* the court commented: "[T]he work of construction in accordance with adopted plans is purely ministerial; it must, therefore, like all ministerial duties, be performed in a skillful and careful manner; and the municipality is liable for injuries caused by its negligent performance." *Id.* at 364.

367. *Morton v. Ambridge Borough*, 375 Pa. 630, 101 A.2d 661 (1954); *Vanderslice v. City of Philadelphia*, 103 Pa. 102, 107 (1883); *Land v. Punxsutawney Borough*, 44 Pa. Super. Ct. 171, 175-76 (1910).

368. *Strauch v. Scranton*, 157 Pa. Super. Ct. 174, 178, 42 A.2d 96, 98, *aff'd per curiam*, 353 Pa. 10, 44 A.2d 258 (1945).

369. See *McCracken v. Curwensville Borough*, 309 Pa. 98, 104, 163 A. 217, 219 (1932).

370. *McCracken v. Curwensville Borough*, 309 Pa. 98, 163 A. 217 (1932); *Strauch v. Scranton*, 157 Pa. Super. Ct. 174, 178-79 (1945), *discussing*, *McDonough v. Munhall Borough*, 331 Pa. 468, 200 A. 638 (1938); *Coleman v. City of Scranton*, 99 Pa. Super. Ct. 3 (1930). It should be noted that each of these cases involved the city's duty to provide drainage in order to avoid ice accumulations which endangered pedestrians and vehicular travel.

ments.³⁷¹ Thus, the prior distinctions between “discretionary” and “ministerial” duties, and between “governmental” and “proprietary” powers, are no longer effective. The court’s guiding statements, in sharp contrast to the views expressed in *Carr v. Northern Liberties*,³⁷² reveal the general attitude of the judiciary in approaching modern municipal tort cases:

Recently, this Court reiterated the prevailing philosophy that liability follows tortious conduct. . . . [W]e said: “It is fundamental to our common law system that one may seek redress for every substantial wrong. The best statement of the rule is that a wrongdoer is responsible for the natural and proximate consequences of his misconduct.”³⁷³

In deciding to apply this rule to governmental bodies the court noted:

Appellee offers no reason — and we are unable to discern one — for permitting governmental units to escape the effect of this fundamental principle.

“As we have stated many times before, today cities and states are active and virile creatures capable of inflicting great harm, and their civil liability should be co-extensive. Even though a governmental entity does not profit from its projects, the taxpaying public nevertheless does, and it is the taxpaying public which should pay for governmental maladministration. If the city operates or maintains injury-inducing activities or conditions, the harm thus caused should be viewed as a part of the normal and proper costs of public administration and not as a diversion of public funds. The city is a far better loss-distributing agency than the innocent and injured victim.”³⁷⁴

Whether this change in the judicial attitude toward the immunity doctrine portends a major overhaul of laws applicable to municipal drainage and storm water activities remains an open question. Although municipalities have long been shielded from liability for failing to control accelerated runoff engendered by “natural and ordinary” urban development, *per se* immunity has

371. *Ayala v. Philadelphia Bd. of Pub. Educ.*, 453 Pa. 584, 305 A.2d 877 (1973). Prior to the decision in *Ayala*, municipal corporations and quasi-corporations, such as school districts, were not liable for the tortious conduct of their employees. *Id.* at 590, 305 A.2d at 880.

372. 35 Pa. 324 (1860). See notes 353–358 and accompanying text *supra*.

373. *Ayala v. Philadelphia Bd. of Pub. Educ.*, 453 Pa. 584, 594–95, 305 A.2d 877, 882 (1973), quoting *Neiderman v. Brodsky*, 436 Pa. 401, 403, 261 A.2d 84, 85 (1970).

374. 453 Pa. 584, 594–95, 305 A.2d 877, 882 (1973), quoting Comment, 32 AM. TRIAL LAW. J. 284, 288 (1968).

now been stripped away. Negligence in the *design* of drainage structures — failure to exercise reasonable care in engineering storm water systems of adequate capacity to avoid unnecessary injury — can no longer be distinguished from negligent construction and maintenance. If a municipality negligently adopts and implements a drainage plan, it may be legally responsible for resulting injuries. But what if it simply does nothing, allowing the expansion of private development, streets, and other activities to drastically alter runoff quantities and velocities and create or exacerbate flooding conditions? Negligence consists of failure to use reasonable care in performing, or *failing to perform*, a duty owed to the party injured.³⁷⁵ Yet, current Pennsylvania statutes authorizing municipal storm water management projects³⁷⁶ still do not explicitly impose a duty to install such systems or control runoff where necessary to avert public and private injury. Unless the courts overturn 199 years of precedent and reinterpret these statutory provisions to impose an implied duty upon municipalities to avoid and abate “injury-inducing . . . conditions”³⁷⁷ created by municipal development,³⁷⁸ major reform in this area of drainage law must await the action of the General Assembly.

C. *Municipal Responsibility in Reviewing Drainage Provisions of Development Plans*

The Pennsylvania Municipalities Planning Code (Planning Code)³⁷⁹ authorizes municipalities to prepare and adopt “comprehensive plans” for community development,³⁸⁰ zoning ordinances,³⁸¹ and subdivision and land development ordinances and regulations.³⁸² When a local government body fails to formulate such development plans and ordinances, the county is empowered to prepare and enforce zoning and subdivision controls until the local unit acts.³⁸³ Neither municipal nor county governments are required to enact land use plans and controls; exercise of their regulatory development powers is optional.³⁸⁴ If exercised, however, the Planning Code

375. See note 165 *supra*.

376. See note 352 *supra*.

377. *Ayala v. Philadelphia Bd. of Pub. Educ.*, 453 Pa. 584, 594, 305 A.2d 877, 882 (1973).

378. See *Briener v. C & P Home Builders, Inc.*, 536 F.2d 27 (3d Cir. 1976), *aff'g in part* 398 F. Supp. 250 (E.D. Pa. 1975) (borough held not liable for negligent enforcement of subdivision ordinance and approval of development plan without adequate drainage provisions).

379. PA. STAT. ANN. tit. 53, §§ 10101-11202 (Purdon 1972).

380. *Id.* §§ 10301-10306.

381. *Id.* §§ 10601-10619.

382. *Id.* §§ 10501-10515.

383. *Id.* §§ 10502, 10602.

384. *Id.* § 10301.

prescribes certain minimum criteria for municipal plans and ordinances which must be satisfied. Moreover, the common law may impose particular duties upon the adopting and administering agencies.

Comprehensive plan requirements for storm water management are vaguely defined in the Planning Code. Each comprehensive plan must contain "[a] plan for community facilities and utilities, which may include . . . storm drainage."³⁸⁵ Thus, it appears that drainage regulation is but an optional element of municipal comprehensive plans. Moreover, the effect of county and municipal comprehensive plans is, at most, that of advisory guidelines. After adoption of a plan, the Planning Code merely requires that certain municipal actions be submitted to the local planning agency for comment and a "specific statement as to whether or not the proposed action is in accordance with the intent of the formally adopted comprehensive plan."³⁸⁶ Since a comprehensive plan has no compulsory effect,³⁸⁷ the adoption of a zoning or subdivision ordinance or the approval of a subdivision development plan need not conform to the comprehensive plan guidelines.

The provisions of the Planning Code relating to subdivision ordinances are more specific but not necessarily obligatory.³⁸⁸ When a subdivision ordinance is adopted, however, no subdivision or land development, storm sewer, or other improvement may be laid out or constructed unless it is conducted pursuant to the ordinance's requirements.³⁸⁹ Municipalities may require that drainage improvements be completed as a condition precedent to approval of the development,³⁹⁰ or may mandate the posting of performance bonds

385. *Id.* § 10301(4) (emphasis added).

386. *Id.* § 10303. The adoption of zoning and subdivision ordinances are among some of the municipal actions which must be presented to the local planning agency for review. *Id.*

387. See *Saenger v. Planning Comm'n of Berks County*, 9 Pa. Commw. Ct. 499, 308 A.2d 175 (1973) (municipality not required to adhere to county's comprehensive plan). The Planning Code only requires zoning ordinances to contain a statement of "community development objectives" which may be supplied by reference to a comprehensive plan or such portions of a plan as may exist, or to a statement of legislative findings and purposes. PA. STAT. ANN. tit. 53, § 10606 (Purdon 1972).

388. Subdivision and land development ordinances may include:

Provisions for ensuring that: (i) the layout or arrangement of the subdivision or land development shall conform to the comprehensive plan and to any regulations or maps adopted in furtherance thereof; . . . (iii) adequate easements or rights-of-way shall be provided for drainage and utilities; . . . (v) . . . land which is subject to flooding . . . either shall be made safe for the purpose for which such land is proposed to be used, or that such land shall be set aside for uses which shall not endanger life or property or further aggravate or increase the existing menace.

PA. STAT. ANN. tit. 53, § 10503(2) (Purdon 1972).

389. *Id.* § 10507.

390. *Id.* §§ 10503(3), 10509.

or other security to assure their completion.³⁹¹ If a municipality or county adopts a subdivision ordinance and assumes the responsibility for reviewing development plans, two issues arise: 1) the duty to be imposed upon the community to adopt and administer adequate storm drainage standards, and 2) the duty to be imposed upon the municipality to enforce such standards if adopted.

Breiner v. C & P Home Builders, Inc.,³⁹² provides a disappointing and limited answer to the second of these questions. Alburdis Borough approved a residential subdivision plan which did not contain adequate drainage control provisions to prevent flooding of adjacent properties,³⁹³ despite a borough regulation requiring the installation of drainage systems upon development.³⁹⁴ The resulting uncontrolled runoff severely damaged neighboring farm lands located across the borough line in an adjacent township.³⁹⁵ The Third Circuit Court of Appeals reversed a district court ruling holding the borough jointly and severally liable with the developer for damages exceeding \$36,000.³⁹⁶ The court found that the borough ordinance required that the subdivision plan show artificial drainage works only if proposed by the developer and permitted the borough to demand the installation of drainage systems in its discretion.³⁹⁷ Therefore, the court concluded that if the developer did not propose a "mechanical drainage system" and the borough did not insist upon drainage facility installation, submission of a drainage plan was not mandated by the ordinance, and approval of the subdivision plan without drainage details did not violate the borough's ordinance.³⁹⁸

More surprising was the court's suggestion that, even if the borough had flagrantly violated its own ordinance by failing to

391. *Id.* § 10509.

392. 536 F.2d 27 (3d Cir. 1976), *aff'g in part* 398 F. Supp. 250 (E.D. Pa. 1975).

393. 536 F.2d at 29. The approval of the plan was contrary to the recommendation of the municipal engineer. *Id.*

394. Alburdis Borough, Pa., Subdivision and Land Development Ordinance, Art. VI, § 4 (Feb. 1, 1960), *quoted in* *Breiner v. C & P Home Builders, Inc.*, 398 F. Supp. 250, 256-57 (E.D. Pa. 1975). The regulations mandate that:

All storm drains and drainage facilities such as gutters, inlets, bridges, storm sewers and culverts as may be required by the Borough, shall be installed by the developer and the land graded for adequate drainage. Street grades shall be such that no surface drainage is discharged over lots; where topographic conditions require that drainage ways other than streets or alleys must be employed, prepared easements shall be provided over them.

All details of drainage systems shall be shown on the Final Plan, or by means of an accompanying Drainage Plan.

Alburdis Borough Subdivision and Land Development Ordinance, Art. VI, § 4 (Feb. 1, 1960).

395. 536 F.2d at 29.

396. *Id.* at 34.

397. *Id.* at 32.

398. *Id.*

require adequate drainage, it would have owed no duty to injured landowners lying outside its municipal boundaries.³⁹⁹ Essentially, the court ruled 1) that the ordinance was intended to benefit directly the borough's residents and property, and not to protect landowners outside the municipality; 2) that the ordinance imposed no duty on the borough to protect land in adjacent areas from surface water drainage; and 3) that, while the borough's officers and employees were compelled to exercise due care in approving subdivision plans, they were under no obligation to review the final plan for potential adverse effects on areas outside the municipal limits.

The Third Circuit's decision appears contrary to the major policy consideration that influenced the Pennsylvania Supreme Court to abrogate the doctrine of municipal immunity: the sobering effect that such an imposed duty would have on municipalities and their officers.⁴⁰⁰ The decision stands as an open invitation to city, borough and township officers to disregard the negative drainage effects of development and accelerated storm water upon adjacent communities, which have no political voice in the decisions affecting their lands and no legal recourse against a callous disregard of their interests. With neither political nor legal accountability, careful review of drainage plans by municipalities is likely to remain a chimerical vision.

For the future, Pennsylvania must seriously address the issue of whether, and under what circumstances, a municipality has a duty to *adopt* and *enforce* drainage standards to protect landowners from accelerated runoff. The duty to adopt and the obligation to enforce adequate drainage rules cannot be separated. It would be folly merely to impose an enforcement duty upon those communities that adopt drainage standards without also obligating all municipalities to develop drainage regulations.⁴⁰¹ On the one hand, courts may be

399. *Id.*

400. See *Ayala v. Philadelphia Bd. of Pub. Educ.*, 453 Pa. 584, 599, 305 A.2d 877, 884 (1973), where the court stated: "[W]here governmental immunity has had the effect of encouraging laxness and a disregard of potential harm, exposure of the government to liability for its torts will have the effect of increasing governmental care and concern for the welfare of those who might be injured by its actions." *Id.*, quoting Note, *The Discretionary Exception and Municipal Tort Liability: A Reappraisal*, 52 MINN. L. REV. 1047, 1057 (1968).

401. The district court in *Breiner*, however, suggested the contrary:

[A] duty [to enforce subdivision drainage regulations] does not impose a heavy burden on municipalities and their officers, but merely clarifies a function that most already carry out. This Court is not requiring the Borough to order the construction of, or itself construct, a drainage system for each subdivision, but rather is saying that the Borough should withhold approval of a subdivision plan until such time as it complies with all the provisions of its land subdivision ordinance, a duty easily complied with.

398 F. Supp. at 256.

reluctant to order governing municipal bodies to exercise their legislative discretion in a particular manner. Yet, if municipalities could evade liability for negligent approval of subdivision plans merely by refusing to adopt, or by repealing, drainage regulations, communities would have a strong incentive to avoid promulgating needed storm water management codes lest they be held liable for negligent enforcement. Not only would the path of inaction be safest, but also, any attempt to regulate would result in potential municipal malpractice. Until the courts or legislature clearly impose a duty upon local governments to review and approve drainage plans in accordance with reasonable storm water management practice, there will be every reason for municipalities to display less rather than more governmental concern for the welfare of those who might be injured by poorly planned land development.

D. *Some Exemplary Municipal Programs*

In the face of significant and conflicting pressures, several Pennsylvania municipalities have adopted storm drainage programs worthy of special comment. In this article, there is insufficient space to discuss each of the meritorious local programs previously enacted or now under consideration. Instead, this section will concentrate on a few county and municipal activities which exemplify the options available to Pennsylvania local governments.

1. *Philadelphia-Wissahickon Watershed Development Regulations*

The Wissahickon watershed within Philadelphia comprises an area of eleven square miles with a unique combination of urban and natural assets.⁴⁰² Recognizing the need to preserve these assets while preparing for new development, the City of Philadelphia undertook an intensive study of the watershed in 1972, drawing upon the expertise of consultants and a task force of local citizens and city and state officials to shape recommendations for action.

The studies of the Wissahickon Creek and its environs commissioned by the city demonstrated the important interface between developmental activities and storm water management.⁴⁰³ It should be noted that the Wissahickon may be less sensitive to runoff problems than many other urbanizing watersheds due to its unique

402. PHILADELPHIA CITY PLANNING COMM'N, WISSAHICKON WATERSHED DEVELOPMENT GUIDE 4 (1976) (hereinafter cited as GUIDE). Within the Wissahickon watershed lie Fairmount Park and the neighborhoods of Germantown, Mount Airy, Chestnut Hill, Roxborough, and East Falls. *Id.*

403. See REGIONAL SCIENCE RESEARCH INSTITUTE, ENVIRONMENTAL STUDY OF THE WISSAHICKON WATERSHED WITHIN THE CITY OF PHILADELPHIA (1973).

hydrologic characteristics and the large percentage of dedicated public open space. Peak discharges at the creek mouth increased only five to twenty percent from 1900 to 1968.⁴⁰⁴ This range is substantially lower than would be expected given the change in land uses over the period.⁴⁰⁵ The impacts of urban development on the smaller tributary streams, however, were shown to be very significant.⁴⁰⁶ The volume of one-, five-, and ten-year flood discharges were often more than doubled or tripled by urbanization.⁴⁰⁷

Armed with this information, the city developed a sophisticated set of laws, regulations, and policies to guide development in the watershed. The Philadelphia City Planning Commission explained the rationale underlying this rulemaking process:

By adopting these controls the City has acknowledged that storm water runoff, pollution and the visual features of developed areas all have serious impacts on the quality of neighborhood parklands, and, conversely, that the environmental stability of open space has profound influence on the quality of life in the developed areas of the Watershed.⁴⁰⁸

The Wissahickon Watershed Ordinance,⁴⁰⁹ adopted in 1975, mandates compliance with environmental standards which: 1) require the formulation of earth moving plans and erosion controls; 2) impose limitations on the extent of impervious ground cover; 3) control construction on steep slopes; and 4) require setbacks from water courses.⁴¹⁰ Each of these elements has a major impact on storm water control.

The lands within the Wissahickon Valley have been classified and mapped on a five-acre grid basis according to the capacity of tributary stream channels and runoff characteristics.⁴¹¹ For each area, a limit on permissible impervious ground cover is established, ranging from twenty to forty-five percent.⁴¹² One category has no maximum coverage limit, thereby allowing parcels in excess of one-half acre to be developed provided that the increased runoff from the site does not adversely affect adjacent property, the method of handling runoff is in accordance with sound engineering practice

404. *Id.* at 59.

405. *Id.*

406. *Id.* at 61.

407. *See id.* at 72 (table 9).

408. GUIDE, *supra*, note 402, at 4.

409. PHILADELPHIA CODE § 14-1603 (1975).

410. *Id.* § 14-603(4).

411. *Id.* § 14-603(4)(c) (Map B). Runoff characteristics include geologic, topographic, and hydrologic considerations.

412. *Id.* § 14-1603(4)(c)(1).

and prevents significant accelerated erosion, and the infiltration capacity of the site is not significantly diminished.⁴¹³ If countermeasures are taken to ensure that "storm water leaving the property shall be substantially similar in effect to that under the basic impervious coverage limitation,"⁴¹⁴ developers will be permitted to install impervious surfaces to a greater degree than permitted under the basic coverage rules. Countermeasures that may warrant waiving the application of the basic coverage rules include: use of pervious paving materials, such as lattice blocks or porous asphalt; installation of seepage pits, dutch drains, and similar infiltration structures; and utilization of detention basins and structures to control the peak flow and velocity of runoff.⁴¹⁵ Specific performance standards and design criteria, which are established in the Philadelphia City Planning Commission Regulations (Regulations),⁴¹⁶ were derived on the basis of controlling runoff from rainfall events having a two-hour duration and a recurrence interval of twenty-five years.⁴¹⁷ Where detention basins, however, are unable to discharge directly into a stream, they must be capable of retaining a two-hour, fifty-year storm.⁴¹⁸ It should be noted that the selection of the design storm to be used as the model must be at least partially based upon the watershed in question. In a small watershed such as the Wissahickon and its tributaries, a short-duration, flash-flood storm — such as a two-hour, twenty-five-year event — may be far more critical than longer rainfall events — such as a twenty-four-hour, twenty-five- or fifty-year storm.⁴¹⁹

In addition to accelerated runoff control, the Philadelphia program provides standards to be observed to prevent accelerated erosion and sedimentation resulting from earth moving and development. The areal extent of land disturbed by earth moving must be minimized⁴²⁰ and surface water must be diverted from the exposed project area.⁴²¹ Stabilization of slopes, channels, ditches, and disturbed areas is mandated.⁴²² In order to avoid high velocity flows and scouring of disturbed land, minimum capacities for

413. *Id.* (category 5).

414. *Id.* § 14-1603(4)(c)(2)(a).

415. PHILADELPHIA CITY PLANNING COMM'N, WISSAHICKON WATERSHED DEVELOPMENT REGULATIONS, § I.C. (1975) [hereinafter cited as REGULATIONS].

416. *Id.*

417. *Id.* § I.C.4.a.

418. *Id.* § I.C.4.e.

419. See R. KERR, D. MCGINNIS, B. REICH & T. RACHFORD, ANALYSIS OF RAINFALL — DURATION — FREQUENCY FOR PENNSYLVANIA 122 (Pa. State University, Institute for Research on Land & Water Resources, Research Pub. No. 65, 1970).

420. REGULATIONS, *supra* note 415, § II.D.2.a.

421. *Id.* § II.D.2.b.

422. *Id.* § II.D.2.d-e.

diversion terraces and channels⁴²³ and maximum flow velocities⁴²⁴ are established. In addition, design standards for sediment basins, to allow settling of silt from runoff, are set forth in the Regulations.⁴²⁵ A permit for earth moving activities is required except in those cases where 1) the activities involve plowing or tilling for agricultural purposes; 2) an erosion plan has been developed for the activity by the Soil Conservation Service of the United States Department of Agriculture (SCS); 3) the activity is necessary in order to receive certain state or federal permits; 4) the site is one-half acre or less in area; or 5) the earth moved or impervious cover will be less than 500 square feet.⁴²⁶ However, even if an earth moving permit is not required, the performance standards for erosion and runoff control remain in effect.⁴²⁷

Philadelphia's sophisticated approach to the Wissahickon watershed contains many commendable features. It provides performance standards that developers and engineers can follow in preparing site plans, and includes suggestions for practical storm drainage provisions that can be incorporated into minor as well as major land developments. Perhaps most importantly, Philadelphia's program directly addresses each of the interrelated aspects of the storm water management problem: impervious surfaces, land slopes, increased volumes of runoff, accelerated velocities of runoff, erosion, and sedimentation.

The Wissahickon approach, however requires a complex watershed analysis in order to establish maximum impervious surface standards which would avoid overburdening stream channel capacity.⁴²⁸ A plan modeled after the Wissahickon is more difficult both to prepare and implement than one similar to the plan formulated by Chester and Bucks Counties, which establishes a no-increase-in-peak-runoff criteria for all developments.⁴²⁹ In some areas, unlike the Wissahickon watershed, tributary stream channels may not have sufficient excess capacity to absorb the accelerated runoff even from a limited amount of new impervious surfaces.

423. *Id.* § II.D.3.a.1. These minimum capacities are set at 1.6 cubic feet per second per acre for temporary facilities and 2.75 cubic feet per second for permanent diversions. *Id.*

424. *Id.* §§ II.D.2.c., II.D.3.a.3., II.D.3.b.3., II.D.3.c.1. The maximum flow velocities are established at 1.5 feet per second for channels and 3.0 feet per second for outlet structures. *Id.*

425. *Id.* § II.D.3.d.

426. *Id.* § II.F.1.a.

427. *Id.* § II.F.1.b.

428. D. DAHLEM & F. SCHWARTZ, REGIONAL STANDARDS AND CRITERIA FOR STORMWATER MANAGEMENT 2 (Delaware Valley Regional Planning Commission Technical Report No. 11, 1974) [hereinafter cited as DVRPC REGIONAL STANDARDS].

429. See notes 431-446 and accompanying text *infra*.

Moreover, because of the demand for intensive land use, a low level of impermeable surface cover may be difficult to achieve in many urban areas.⁴³⁰ Thus, the Wissahickon concept must be adapted with care only to those areas which, after extensive analysis, are shown to be amenable to such an approach.

2. Bucks County and Chester County Programs

The basic concept of the programs recommended by the Delaware Valley Regional Planning Commission (DVRPC) and adopted by various communities in Bucks and Chester Counties is simple: the peak discharge of runoff after development for the design storm should be no more than the peak flow before the development was undertaken.⁴³¹ Each development should be planned, and drainage facilities designed, to limit peak flows to natural or preexisting conditions.⁴³² This approach was initially adopted by the Chester County Soil and Water Conservation District and promoted on a voluntary basis with the cooperation of local landowners and developers.⁴³³ Subsequently, with the assistance and encouragement of county and regional planning agencies,⁴³⁴ a number of Bucks and Chester County communities adopted "zero excess discharge" performance standards as part of their zoning or subdivision ordinances.⁴³⁵

430. DVRPC REGIONAL STANDARDS, *supra* note 428, at 2.

431. DVRPC REGIONAL STANDARDS, *supra* note 428.

432. *Id.* at 21-22.

433. *Id.* at 1-2.

434. Particularly active were the Bucks County Planning Commission's Division of Natural Resources, the Chester County Planning Commission, and the Conservation Districts of both counties. These agencies conducted educational programs, helped draft ordinances, and waged an active lobbying campaign, all in an effort to promote the adoption of zero excess discharge statutes.

435. *See, e.g.*, Quakertown Area Zoning Ordinance §504(8) (adopted jointly by Milford Township, Haycock Township, and Trumbauersville Borough in 1975). This ordinance provides as follows:

Storm water: All developments shall limit the rate of storm water run-off so that the rate of run-off generated is no more than that of the site in its natural condition. Where farm field or disturbed earth is the existing condition, meadow shall be used as the starting base for such calculations instead of the actual condition. All run-off calculations shall be based on 100 year, 24-hour storms. The method for such calculations shall be that contained in United States Department of Agriculture, Soils Conservation "Engineering Field Manual, Notice #4" of April 30, 1971, as amended.

A development shall not be required to meet the above provisions if it meets all of the following criteria:

- (a) It lies within a borough which has storm sewer connections to the site.
- (b) The site area is 2 acres or less.
- (c) The impervious surface ration of the developed site is no greater than .20 in suburban districts, .30 in urban districts, and .80 in nonresidential districts.

Id. (emphasis in original). Similar provisions have been adopted by Buckingham Township, Wrightstown Township, Langhorne Manor Borough, Hulmeville Borough, New Britain Township, Riegelsville Borough, and Springfield Township.

The DVRPC has set forth the advantages of the zero excess peak discharge approach:

1. The criterion is easy to apply. Enforcement [by municipalities] would require only that peak discharge before and after development be determined and facilities designed to limit the peak. This would be a performance standard with the means of meeting the criteria up to the developer, regardless of the type of cover.

2. The criterion is fair. All developers would be treated with equal stringency. There would be no need to justify different standards for different areas.

3. The criterion has a sound legal basis. . . . It makes individuals liable for actions which have historically contributed to loss of life and property damage.

4. The criterion is meaningful and cost effective. It is well established that the natural stream regimen is the most stable condition and that alterations in flow, channel size and channel lining will in general be detrimental to some degree. Countermeasures such as channellizing, piping, levees, etc., are likely to be more costly than limiting discharge to before development levels. Small incremental effects of individual developments cannot be ignored since the cumulative effect of numerous developments in a watershed has often caused severe flooding problems. The main attraction of the zero discharge concept is that the facilities necessary to limit peaks — usually retention basins, recharge pits and pervious infiltration areas — are minimal in cost compared to after-the-fact remedial measures.⁴³⁶

Two critical issues, however, arise in applying a zero excess discharge standard: selection of a design storm upon which to base the pre- and post-development runoff calculations, and selection and design of drainage countermeasures to control peak flows.

With respect to the former issue, most of the Bucks County communities have selected the twenty-four-hour, one hundred-year storm as a basis for designing runoff controls, primarily from a desire to ensure that the one hundred-year flood plain area is not expanded downstream by accelerated runoff from impervious surfaces.⁴³⁷ Federal flood insurance requirements and local flood plain management ordinances are drafted to restrict damage-prone

436. DVRPC REGIONAL STANDARDS, *supra* note 428, at 21-22.

437. Interview with George Collier, Dist. Conservationist, Bucks County Soil & Water Conservation Dist. (May 20, 1976).

development in areas inundated by a one hundred-year flood.⁴³⁸ The argument supporting the Chester and Bucks County runoff standards is that all future development should be designed to preclude expansion of both peak flows during a major flood and the flood plain area which must be regulated.

Use of the one hundred-year *storm* does not mean a one hundred-year *flood* is curtailed. Flood levels are determined by a number of factors, including storm rainfall and duration, slopes, soil types and saturation conditions, and preexisting stream flows. A one hundred-year flood may be produced by a less intensive storm than a one hundred-year event which falls on saturated soil in times of relatively high stream flow.⁴³⁹ The peak runoff of twenty-four-hour, one hundred-year storm and a two-hour, fifty-year storm in eastern Pennsylvania have, in fact, been calculated to be nearly identical.⁴⁴⁰

Some studies indicate that installing impervious surfaces has far less impact upon peak runoff from large storms than upon runoff from smaller but more frequent events. Large storms, such as Hurricane Agnes, tend to saturate the soil so that over ninety percent of the rainfall will run off.⁴⁴¹ The saturated soil in a large storm reacts much like a roof, pavement, or other artificially created impervious surfaces, and thus the "natural condition" peak runoff and "post-development" drainage flow may not be drastically different. By contrast, urbanization may double or triple runoff during less intense five-, ten-, and twenty-five-year events.⁴⁴² In terms of reducing downstream damage, accelerated runoff controls that are imposed on land developments may produce greater benefits if addressed to these more frequent, less intense storms. If less intense events are used as models to establish the capacity of retention devices, the runoff of larger storms will also be somewhat ameliorated by the same structures, provided that all structures are designed to remain stable under the more severe conditions.

Another potential criticism of the use of large storm criteria to design runoff controls is the apprehension that only the largest

438. See 42 U.S.C. §§ 4001-4128 (1970 & Supp. V 1975); 24 C.F.R. § 1910.3 (1976). See generally UNITED STATES WATER RESOURCES COUNCIL, A UNIFIED NATIONAL PROGRAM FOR FLOOD PLAIN MANAGEMENT IV-4 to -7, V-5 to -8 (1976).

439. Interview with Vaden R. Butler, Chief, Div. of Dams & Encroachments, Pa. Dep't of Environmental Resources (Sept. 16, 1976); Interview with George Coller, *supra* note 437.

440. Interview with George Coller, *supra* note 437. A 2-hour, 50-year storm is a concentrated downpour, while the 24-hour, 100-year storm is less intensive, but has a longer duration. The peak flow will depend on watershed characteristics which govern concentration time (the time necessary for water to reach a certain point in the watershed), including slope, soils, antecedent moisture conditions, and urbanization. Interview with Vadin R. Butler, *supra* note 439.

441. Interview with Vadin R. Butler, *supra* note 439.

442. See note 7 *supra*.

storms will be accommodated, thereby leaving the exacerbation of smaller events — which cause much of the annual flood damage — largely unchecked. Some may be led to assume that flood plain management ordinances and storm drainage controls based upon the one hundred-year event will eliminate or reduce flood damages. Unfortunately, curtailing an increase of the one hundred-year flood level does not necessarily mean that increased damages during lesser floods will be avoided. Flood plain management regulates construction in one hundred flood-prone areas, but does not prohibit all development.⁴⁴³ New, as well as preexisting, homes, offices, farms, and factories will remain in the flood area, subject to damage from small as well as large floods. Thus, in some watersheds, controlling accelerated runoff from numerous five-, ten-, and fifteen-year storms may be as, or more, important than addressing the occasional large flood.

The extent to which activities conducted pursuant to the Chester-Bucks County model regulations will deal effectively with drainage problems during smaller storms will depend upon the technical design of the various countermeasures used to reduce runoff from developments. For example, if the “natural” runoff from a site is estimated to be fifty cubic feet per second for a ten-year storm and one hundred cubic feet per second for a one hundred-year storm, under the Chester-Bucks County model, a developer might install a retention pond with an outlet pipe capable of discharging no more than one hundred cubic feet per second. Although a pipe with this capacity will control the peak runoff from the development during a large storm, the outlet could allow a considerable acceleration of runoff during a ten-year storm before it had any effect. Depending upon the type of the outlet, its location, the hydraulic “head” needed to reach its maximum flow, and other factors, the structure may only partially control the accelerated flow from lesser storms. A retention structure constructed with a weir spillway or multiple outlets would be capable of releasing variable flows depending upon the amount and elevation of water stored in the reservoir.⁴⁴⁴ Experience with some developments following the one hundred-year storm criteria has indicated that downstream flooding during lesser rainfall events

443. See 24 C.F.R. § 1910.3 (1976) (flood plain management and flood-proofing standards for communities participating in national flood plain management); 41 Fed. Reg. 24,909 (1976) (Delaware River Basin Commission Standards for flood plain construction).

444. R.S. NORTON, JR., DESIGNING STABLE STREAM SYSTEMS IN AN URBAN ENVIRONMENT (American Soc’y of Agricultural Engineers, Chicago, Ill., Paper No. 75-2546, December 15-18, 1975).

has been reduced.⁴⁴⁵ This may be credited more to the cooperative efforts between developers, engineers, the SCS district staff, and municipal officials in designing sophisticated runoff programs rather than to the simple application of the storm water regulations. Mere adoption of a one hundred-year storm criteria will *not* ensure that runoff from less intensive rainfall events will remain at the predevelopment level or that downstream damage will be avoided.

The DVRPC recommendations for storm water management do not adopt a single design storm as a model but suggest that different criteria would be appropriate under various conditions, depending upon the extent and nature of property to be protected, the watershed characteristics, and the aspect of the drainage system under consideration.⁴⁴⁶ While this article does not attempt to resolve these technical issues or to recommend a definitive set of standards, lawyers, legislators, administrators, and local officials should be aware that such questions exist for which easy answers are unavailable.

3. *Lehigh-Northampton Joint Planning Commission Drainage Plan*

Perhaps the most ambitious effort outside the Delaware Valley to consider all aspects of storm water management on a regional basis was undertaken by the Joint Planning Commission of Lehigh-Northampton Counties (JPC). In response to the increasing concern over the intermunicipal impact of accelerated storm runoff and flood control⁴⁴⁷ and the need for a regional plan to qualify local projects under the United States Department of Housing and Urban Development's (HUD) Basic Water and Sewer Facilities grant program,⁴⁴⁸ the JPC prepared one of the Commonwealth's first truly comprehensive regional storm water management plans. As adopted in August 1975, the Lehigh-Northampton Regional Storm Drainage Plan (JPC Plan)⁴⁴⁹ encompasses a broad range of topics, including 1) methods of analyzing storm runoff, 2) runoff analyses for various watersheds to be used by municipal officials in reviewing develop-

445. Interview with George Coller, *supra* note 437. The prime example cited for runoff reduction of small as well as large storms through systems designed for the 100-year storm is Exton Mall in Chester County, which utilizes roof and parking lot retention systems. *Id.*

446. DRVPC REGIONAL STANDARDS, *supra* note 428, at 10-11.

447. A. O'DELL, REGIONAL STORM DRAINAGE PLAN — 1976 SUPPLEMENT 1 (1976) (Joint Planning Commission Lehigh-Northampton Counties); Interview with Alan O'Dell, Chief Planner, Joint Planning Commission in Lehigh-Northampton Counties (August 27, 1976).

448. See 42 U.S.C. § 3102(c)(1) (Supp. V 1975); 24 C.F.R. § 555.1-.9 (1976).

449. A. O'DELL, W. THURBER, & J. FRITZ, *supra* note 241 (adopted by JPC in 1975).

ment plans, 3) the flow of storm water into sanitary sewer systems, 4) identification of critical drainage problems, 5) flood plain management, 6) alternative structural and non structural measures to handle runoff problems, and 7) an implementation program.

One of the most important consequences of the JPC Plan, for state as well as local officials, was a demonstration of the cost-effectiveness of maintaining natural swales and drainage channels and requiring storm water control and retention in subdivision plans. The JPC compared the cost of natural grass swale channel maintenance with various storm sewer alternatives, such as metal and reinforced concrete pipe, paved surface, and plain rubble, to establish the required flow capacities.⁴⁵⁰ Applying a detailed analysis to one 620-acre watershed in the JPC region, the planners considered two possible storm drainage systems. One system required the use of natural swales as part of any new developments, ranging from forty to eighty feet in width, protected from encroachment by easement or dedication, and augmented by flow retardation devices such as detention basins.⁴⁵¹ The second approach contemplated the installation of a storm sewer system ranging from seventy-two to ninety-six inches in diameter.⁴⁵² The storm sewer system would cause runoff to reach the mouth of the watershed in twenty minutes, compared to approximately forty minutes for a natural swale.⁴⁵³ Peak flows at the bottom of the watershed would be thirty percent higher with the storm sewers.⁴⁵⁴ In a ten-year storm, flows in the lower reaches of the drainage area with the pipe system would be approximately 1225 cubic feet per second, whereas the flow with the swales would be reduced to 800 cubic feet per second.⁴⁵⁵ Under the pipe proposal, several existing culverts would require replacement or improvement in order to accommodate the higher runoff flows.⁴⁵⁶ The total project cost for the storm sewer system was estimated at \$2.4 million — in 1973 dollars — not counting more severe downstream flooding problems exacerbated by the higher peak flows.⁴⁵⁷ In contrast, a natural swale/new development retention system would require twelve acres of open space, which could be made available for recreation, and would cost \$200,000.⁴⁵⁸ Engineers for the JPC roughly estimated that retention basins with

450. *Id.* at 91-92.

451. *Id.* at 89-90.

452. *Id.*

453. *Id.* at 90.

454. *Id.*

455. *Id.*

456. *Id.*

457. *Id.* at 91.

458. *Id.* at 88-91.

a capacity of 50,000 to 100,000 cubic feet, which would serve a typical moderate to large subdivision, could cost \$5,000 to \$10,000 if constructed as part of the initial site development. Annual maintenance for grass mowing and debris clearance was estimated at \$500 to \$1000.⁴⁵⁹

In all areas except highly urbanized ones, and particularly in rural and suburban communities, preservation of natural drainage systems and careful development planning to prevent accelerated runoff is the most cost-effective solution. Post hoc correction of drainage and flooding problems is not only expensive, but often ineffective. As the JPC Plan underscores, predevelopment planning for storm water management can save developers, homeowners, and taxpayers money and misery.

IV. STATE AND FEDERAL PROGRAMS RELATED TO STORM WATER MANAGEMENT

A series of state and federal programs relate directly and indirectly to drainage and storm water management in the Commonwealth. Of these, the most important for the purposes of this discussion include: 1) state and federal flood control facilities and stream improvement programs; 2) dams and encroachments regulations; 3) erosion and sedimentation control measures; and 4) national flood insurance and flood plain management requirements. A brief description of the scope and effect of these programs is necessary to a more thorough comprehension of the state's storm water management problem and its potential solutions.

A. *Structural Flood Control and Stream Improvement Programs*

Both the Commonwealth, through the DER,⁴⁶⁰ and the federal government, through the Army Corps of Engineers (Corps)⁴⁶¹ and the SCS⁴⁶² engage in a wide variety of structural flood control and stream improvement projects. These activities include the construction of dams, dikes, levees and floodwalls, culvert and bridge

459. *Id.* at 95.

460. In 1971, the Pennsylvania DER succeeded to the powers and duties relating to flood control projects formerly vested in the Water & Power Resources Board and the Department of Forests & Waters. PA. STAT. ANN. tit. 71, § 510-1 (Supp. 1977-78). State flood control studies are conducted pursuant to a series of statutory provisions, including *id.* §§ 510-4(7), -5, -9(1); *id.* tit. 32, §§ 653-672 (Purdon 1967 & Supp. 1977-78).

461. See 33 U.S.C. §§ 701-709a (1970 & Supp. V 1975). For a history and description of federal flood control activities, see 4 WATER AND WATER RIGHTS §§ 310-315 (R.E. Clark ed. 1970) [hereinafter cited as 4 WATER RIGHTS].

462. See 33 U.S.C. § 701b-1 (1970); 16 *id.* §§ 1001-1009 (1970 & Supp. V 1975).

enlargements, and channel clearance and modification projects.⁴⁶³ Such projects are usually undertaken on a cooperative, joint-sponsorship basis by federal, state, and local agencies. Federal participation in local flood protection projects, other than dams and channel rectification programs, is dependent upon state and local acquisition of the necessary lands and a commitment to operate and maintain the works.⁴⁶⁴ Generally the state will reimburse a locality for up to fifty percent of the cost of the land and other local expenses incurred under federal projects.⁴⁶⁵ If the state sponsors a local protection project, the local government must acquire the lands and DER will undertake the design, engineering, and construction; thereafter, maintenance is a local responsibility.⁴⁶⁶ For dam and stream rectification projects, responsibility for land acquisition, design, construction, and maintenance is generally assumed by the sponsoring federal agency⁴⁶⁷ or DER⁴⁶⁸ except for incidental recreational or multiple purpose facilities.⁴⁶⁹

Since the late 1930's the Commonwealth has sponsored seventy-eight flood control projects and 1,018 stream improvement projects, for a total expenditure of over \$60 million.⁴⁷⁰ The Corps has

463. The Army Corps of Engineers' (Corps) activities focus on the construction of multipurpose projects and flood protection structures, such as dams, levees, floodwalls, and channel improvements, where a high degree of flood protection is required due to the magnitude of potential flood damages (exceeding \$2 million), or protection can be provided most economically by local structures, such as levees or walls. 4 WATER RIGHTS, *supra* note 461, § 311.2. SCS efforts concentrate on watershed protection through runoff retardation and erosion prevention, land and water conservation, and structural measures that involve agricultural or urban areas subject to intermediate flood problems (potential damages less than \$2 million). See 33 U.S.C. § 701b-1 (1970); 16 *id.* §§ 1001-1009 (1970 & Supp. V. 1975); SOIL CONSERVATION SERVICE, U.S. DEP'T OF AGRICULTURE, WATERSHED PROTECTION HANDBOOK, Pt. 1, App. 5 (1967).

464. 33 U.S.C. §§ 701c, 701c-1 (1970); 16 *id.* § 1004(1) (Supp. V. 1975).

465. Memorandum from John E. McSparran, Chief, Div. of Comprehensive Resources Programming to R. Timothy Weston, Assistant Attny. Gen., Pa. Dep't of Environmental Resources (November 22, 1976) (on file with R. Timothy Weston, Pa. Dep't of Environmental Resources, Harrisburg, Pa.).

466. See DIV. OF WATER RESOURCES PROJECTS, BUREAU OF RESOURCES PROGRAMMING, PA. DEP'T OF ENVIRONMENTAL RESOURCES, STANDARD PROJECT AGREEMENT (1976); OFFICE OF RESOURCES MANAGEMENT, PA. DEP'T OF ENVIRONMENTAL RESOURCES, FLOOD CONTROL MANUAL 5-7 (1975).

467. 33 U.S.C. § 701c-1 (1970).

468. Interview with Robert P. Adams, Chief, Div. of Water Resources Projects, Bur. of Resources Programming, Pa. Dep't of Environmental Resources (August 18, 1976).

469. With respect to federal projects, local and state cosponsors are encouraged to assume responsibility for the collateral operation of recreational, fishing, and hunting facilities. See 16 U.S.C. §§ 460f-12 to -14 (1970 & Supp. V 1975). State sponsored projects primarily involve recreational facilities operated under the state park program. Interview with John E. McSparran, Chief, Div. of Comprehensive Resources Programming, Pa. Dep't of Environmental Resources (July 19, 1977).

470. Memorandum from Robert P. Adams, Chief, Div. of Water Resource Projects, Pa. Dep't of Environmental Resources to R. Timothy Weston, Assistant Attny. Gen., Pa. Dep't of Environmental Resources (August 19, 1976) (on file with R. Timothy

expended over \$638 million on twenty-five major reservoir projects and has installed thirty-four local protection projects requiring \$117 million in federal aid and \$24.8 million in state and local funds.⁴⁷¹ The SCS has supplied sixty-four small flood retention reservoirs for a total cost of \$68 million, and expended almost \$3 million in emergency post-flood stream projects.⁴⁷²

Several recent disasters demonstrated the benefits of flood projects undertaken by state and federal agencies over the past four decades.⁴⁷³ It was estimated that statewide natural flood damages would average \$258 million annually were it not for federal and state flood control structures, which have reduced annual damages to a residual of \$66 million.⁴⁷⁴ But flood control projects are neither inexpensive nor foolproof. A dam or levee is only effective within its design limitations.⁴⁷⁵ It appears flood control efforts have given many communities which lie behind walls or downstream of dams a false sense of security. Construction in flood-prone areas has continued largely unabated in many municipalities.⁴⁷⁶ A combination of increased runoff⁴⁷⁷ and more damage-prone investments in the flood path has eroded the effectiveness of Pennsylvania's current structural control measures. More structural projects are unlikely to resolve the problem. Initial analysis by the Pennsylvania State Water Plan indicates few cost-effective flood control projects on the horizon.⁴⁷⁸ For many communities, the cost of modern dams and dikes far exceeds the amount of damages that such structures would ameliorate. Moreover, the environmental and social impact of dams and dikes virtually precludes universal use of these measures. Other

Weston, Pa. Dep't of Environmental Resources, Harrisburg, Pa.); Memorandum from John B. Barnhard, Chief, Div. of Stream Improvement, Dep't of Environmental Resources to R. Timothy Weston, Assistant Attny. Gen., Pa. Dep't of Environmental Resources (June 29, 1976) (on file with R. Timothy Weston, Pa. Dep't of Environmental Resources, Harrisburg, Pa.).

471. N. ATLANTIC DIVISION, U.S. ARMY CORPS OF ENGINEERS, WATER RESOURCE DEVELOPMENTS IN PENNSYLVANIA (1975).

472. Interview with Clinton Johnson, Soil Conservation Service, U.S. Dep't of Agriculture (September 9, 1976) (all data as of July 1975).

473. See BALTIMORE DIST., UNITED STATES ARMY CORPS OF ENGINEERS, II POST FLOOD REPORT, TROPICAL STORM AGNES, JUNE 1972, BASINS OF THE SUSQUEHANNA AND POTOMAC RIVERS AND MARYLAND PORTIONS OF THE CHESAPEAKE BAY AND ATLANTIC COAST 111-23 (1974); PITTSBURGH DIST., UNITED STATES ARMY CORPS OF ENGINEERS, II POST FLOOD REPORT, TROPICAL STORM AGNES, JUNE 1972 — TECHNICAL REPORT 35-40 (1974).

474. Memorandum, *supra* note 465.

475. When those limits are exceeded, as occurred in Wilkes-Barre when the levees failed during the June 1972 floods, disaster strikes. See A. MUSSARI, APPOINTMENT WITH DISASTER: THE SWELLING OF THE FLOOD (1974).

476. See *id.* at 8-9. As of mid-1977, only 51 Pennsylvania communities had adopted flood plain management controls fully meeting federal flood insurance requirements. See notes 525-530 and accompanying text *infra*.

477. See note 7 *supra*.

478. See BUREAU OF RESOURCES PROGRAMMING, PA. DEP'T OF ENVIRONMENTAL RESOURCES, STATE WATER PLAN, SUBBASINS 1-20, ch. 4, pt. B (1977).

solutions must be sought and implemented to bring the Commonwealth's flood damages under control.

B. *Nonstructural Measures and Flood Plain Management*

Until recently, the prime emphasis of state and federal flood control efforts have concentrated on structural projects to reduce flows, redirect flood waters, or shield communities behind dikes and walls. However, since the late 1960's there has been a strong trend toward fuller utilization of nonstructural alternatives and flood plain management techniques. Among the important elements of nonstructural, flood area management efforts have been 1) open space, recreational, and urban renewal projects to preserve flood hazard areas, 2) flood plain zoning and building code ordinances to regulate flood area construction, 3) "floodproofing" of buildings located in flood plains, 4) flood warning systems, and 5) flood insurance programs.

Since 1974, the Corps, SCS and other federal agencies engaged in developing flood projects have been statutorily directed to consider fully "non-structural alternatives to prevent or reduce flood damages . . . with a view toward formulating the most economically, socially, and environmentally acceptable means of reducing or preventing flood damages."⁴⁷⁹ Nonstructural measures can be financed to the same extent and in comparable federal/local shares as local structural projects.⁴⁸⁰ By removing major financial disincentives to nonstructural measures, the new federal funding provisions allow a wider range of options to the Commonwealth and its communities in selecting the best combination of programs to manage flood damages.

State law authorizing DER sponsorship and participation in flood control programs is still limited to traditional structural approaches, however.⁴⁸¹ No provisions exist allowing DER to finance floodproofing or to acquire floodway lands and easements in order to assure unobstructed passage of flood waters. Relocation assistance for damage-prone facilities to remove them from the flood path is not contemplated by Pennsylvania's current laws. Other state and local powers, such as urban renewal⁴⁸² and park

479. 33 U.S.C. § 701b-11(a) (Supp. V 1975).

480. *Id.* § 701b-11(b) (local sponsors must contribute up to 20 percent of project costs on a basis comparable to the value of lands, easements, and rights-of-way which would have been required for local flood control structural measures).

481. See note 460 *supra*.

482. PA. STAT. ANN. tit. 35, §§ 1701-1747. (Purdon 1964 & Supp. 1977-78). Some of the most blighted areas are left in the wake of massive urban flooding, such as that which struck the Wyoming and Susquehanna valleys in 1972. Where older structures,

development,⁴⁸³ not necessarily intended as flood control measures, are available and in a few instances have been less than successfully used to effect nonstructural solutions for flood problems.⁴⁸⁴ A clear, rational approach to planning and financing for the optimal combination of flood control measures has yet to be incorporated into state law.

C. Water Obstructions Regulation

The DER regulates most Pennsylvania waters and is authorized to issue permits for water obstructions and stream encroachments under the 1913 Water Obstructions Act (Obstructions Act).⁴⁸⁵ The statute, passed in response to a series of devastating floods, is designed to minimize dangers to life and property caused by improper design and maintenance of structures or obstructions of flood flows.⁴⁸⁶ Although the Obstructions Act refers to encroachments "along" streams,⁴⁸⁷ this potential jurisdiction has not been

undesigned to meet flood hazards, are substantially damaged beyond the financial means or will of existing owners to repair, redevelopment may be one of the few viable options available. Wisely used, it may aid in storm water and flood management. Damage-prone structures may be replaced with uses more compatible with flood plain locations or buildings designed to comply with modern flood-proofing standards. For structures which can be saved, resale to new owners may be conditioned upon implementing restorative work which will reduce flood damage potentials, such as relocation of electrical, heating, and plumbing systems.

483. PA. STAT. ANN. tit. 71, §§ 510-2(1), -2(2), -6 (Supp. 1977-78) (state park authorization); *id.* tit. 16, § 2501(b) (county parks); *id.* tit. 53, §§ 3181-3195 (Purdon 1974) (general municipal law); *id.* §§ 24101, 24191 (Purdon 1957) (second class cities); *id.* § 38703 (third class cities); *id.* § 47702 (Purdon 1966) (boroughs); *id.* § 58001 (Purdon 1957) (first class townships); *id.* § 66901 (second class townships). Flood plains, in addition to representing hazard zones, are often attractive recreation and open space assets. *See generally* R. MANN, RIVERS IN THE CITY (1973); PA. ENVIRONMENTAL QUALITY BD., ENVIRONMENTAL MASTER PLAN, POLICIES FOR CRITICAL ENVIRONMENTAL AREAS 10-11 (1976). A number of notable state, county, and municipal parks have been located in riverine flood plains, providing, particularly in urban areas, valuable public access to waterborne activities and aesthetic opportunities.

484. Such programs were, for example, undertaken by Tunkhannock and Lewisburg Boroughs. Tunkhannock Borough used state bond "Project 500" funds to convert eleven single family dwellings, one multifamily dwelling and a fertilizer blending plant, all of which had been heavily damaged by Hurricane Agnes, into a passive community park. "Project 500" funds were made available in the Land and Water Conservation and Reclamation Act, PA. STAT. ANN. tit. 32, §§ 5101-5121 (Supp. 1977-78).

485. PA. STAT. ANN. tit. 32, §§ 681-691 (Purdon 1967); *see id.* tit. 71, §§ 510-1 (1), -4(2) (Supp. 1977-78) (transferring powers of former Water and Power Resources Board to DER). "Water obstructions" are statutorily defined to include "any dam, wall, wing-wall, wharf, embankment, abutment, projection, bridge, or similar or analogous structure, or any other obstruction whatsoever, in, along, across, or projecting into or being in any stream or body of water . . ." *Id.* tit. 32, § 681 (Purdon 1967).

486. *See Water & Power Resources Bd. v. Green Springs Co.*, 394 Pa. 1, 145 A.2d 178 (1958), which contains a discussion of the historical setting and legislative purposes of the Water Obstructions Act. *Id.* at 3-12, 145 A.2d at 180-83.

487. PA. STAT. ANN. tit. 32, § 681 (Purdon 1967).

defined or generally expanded to cover all flood plain development.⁴⁸⁸ Similarly, while the statute regulates activities that change "the course, current or cross section of streams,"⁴⁸⁹ DER has not broadly applied the Obstructions Act to development that increases the quantity or velocity of runoff flowing to and in watercourses.⁴⁹⁰ The core of the statute is aimed at physical structures, such as dams, culverts and bridges, and at channel modifications which may impede stream flows and exacerbate flood damages.⁴⁹¹

The effectiveness of the Commonwealth's water obstructions program is hindered by several problems. First, since the Obstructions Act is only one of several water obstructions laws,⁴⁹² a maze of overlapping and contradictory jurisdictions and inconsistent standards have resulted. While DER regulations cover all categories of encroachments in most parts of the state, the Navigation Commission for the Delaware River⁴⁹³ and the City of Philadelphia⁴⁹⁴ have exclusive jurisdiction over portions of the Delaware River and its tributaries.⁴⁹⁵ The Navigation Commission and the city, however, traditionally regulate harbor structures only for purposes of navigation protection;⁴⁹⁶ they do not cover other encroachments, nor are they explicitly mandated to consider flood obstruction potential and environmental impacts. Second, the existing obstructions laws provide little flexibility in establishing the priorities of the Common-

488. See 25 PA. CODE §§ 105.1-158 (1976). In a few instances, DER has on an individual case basis required permits for buildings or fill located on riparian flood plain lands immediately adjacent to water courses. See, e.g., Memorandum from R. Timothy Weston to Vaden R. Butler, Chief, Div. of Dams and Encroachments (April 4, 1973) (level of flood plain of Bowman's Creek).

489. PA. STAT. ANN. tit. 32, § 682 (Purdon 1967).

490. See 25 PA. CODE §§ 105.1-158 (1976). For a discussion of erosion and sedimentation regulations under other state statutory authority, see notes 492-498 and accompanying text *infra*.

491. Water & Power Resources Bd. v. Green Springs Co., 394 Pa. 1, 10, 145 A.2d 178, 183 (1958); see 25 PA. CODE §§ 105.1-158 (1976).

492. PA. STAT. ANN. tit. 55, §§ 1-16 (Purdon 1964 & Supp. 1977-78); *id.* tit. 71, § 670.2 (Supp. 1977-78); *id.* § 510-4(2); *id.* tit. 53, §§ 14198-14200 (Purdon 1957); PHILADELPHIA CODE § 18-101 to -103 (1973); 351 PA. CODE § 4.4-500(b) (1974) (Philadelphia Home Rule Charter).

493. PA. STAT. ANN. tit. 55, § 1-16 (Purdon 1964 & Supp. 1977-78); *id.* tit. 71, § 670.2 (Supp. 1977-78).

494. PHILADELPHIA CODE § 18-101 to -103 (1973); 351 PA. CODE § 4.4-500(b) (1974) (Philadelphia Home Rule Charter).

495. See PA. STAT. ANN. tit. 32, §§ 681, 690 (Purdon 1967). While the Obstructions Act excludes all projects in the tidal portions of the Delaware River and its navigable tributaries and all projects subject to either the Navigation Commission or City of Philadelphia regulation from the jurisdiction of the DER, the Delaware River Navigation Act specifically declares that no license issued by the Navigation Commission "shall be valid until a permit is granted by the Water and Power Resources Board [now DER]." *Id.* tit. 55, § 7 (Purdon 1964 & Supp. 1977-78).

496. See 7 PA. BULLETIN 1239-46 (May 7, 1977); PHILADELPHIA CODE § 18-101 to -103 (1973).

wealth's regulatory programs. Permits are required for a wide variety of obstructions but no authority is provided for "general permits"⁴⁹⁷ or waivers for minor classes of obstructions. Third, there are no provisions encouraging or requiring self-monitoring and maintenance by obstruction owners and operators. The entire burden of reviewing over 1,000 applications annually and monitoring over 7,000 existing major obstructions is placed on a professional staff of thirteen.⁴⁹⁸

In addition to state obstructions programs, the Corps regulates obstructions and channel modifications in navigable waters of the United States,⁴⁹⁹ including all or major parts of the Ohio, Beaver, Mahoning, Monongahela, Allegheny, Kiskininetas, Conemaugh, Clarion, Delaware, Schuylkill, and Susquehanna Rivers,⁵⁰⁰ under the 1899 Rivers and Harbors Act.⁵⁰¹ The Corps also exercises regulatory jurisdiction over the discharge of dredged and fill materials in "all waters of the United States"⁵⁰² under section 404 of the Federal Water Pollution Control Act,⁵⁰³ and is responsible for implementing a dam safety inspection program.⁵⁰⁴ The Corps' programs are basically limited to traditional obstruction regulation activities, with a sensitivity toward other environmental factors.⁵⁰⁵ Its authority does not encompass broader elements of a comprehensive storm water management effort, but the Corps may assist in assuring proper design and maintenance of potential obstructions if eventually coordinated with state and local storm water and flood plain plans and programs.

497. "General permits" provide general authorization for certain classes of obstructions that meet standardized criteria and are published as regulations or public notices, alleviating the need for individual project sponsors to submit separate plans and obtain separate permits for each minor obstruction. See 33 C.F.R. § 209.120(i)(2)(ix) (1976), 40 Fed. Reg. 31,320, 31,335 (1975) (Corps regulations authorizing general permits for certain activities under the Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1376 (Supp. V 1975)).

498. Interview with Vaden R. Butler, Chief, Div. of Dams and Encroachments, Pa. Dep't of Environmental Resources (August 9, 1976).

499. Navigable waters of the United States are defined to encompass those "waters that have been used in the past, are now used or are susceptible to use as means to transport interstate commerce" and those "waters that are subject to the ebb and flow of the tide." 33 C.F.R. §§ 209.120(d)(1) (1976); see Weston, *Public Rights in Pennsylvania Waters*, 49 TEMPLE L.Q. 515, 516-28, 536-38 (1976).

500. Weston, *supra* note 499, App. II (Pa. State Water Plan Water Laws and Inst. Arrangements Background Rep. No. 1, 1976).

501. 33 U.S.C. §§ 401, 403 (1970).

502. *Id.* § 1362(7) (Supp. V 1975).

503. *Id.* § 1344; see *Natural Resources Defense Council v. Callaway*, 392 F. Supp. 685 (D.D.C. 1975); *Scenic Hudson Preservation Conf. v. Callaway*, 370 F. Supp. 162 (S.D.N.Y. 1973), *aff'd*, 499 F.2d 127 (2d Cir. 1974).

504. 33 U.S.C. §§ 467-467e (Supp. V 1975).

505. See 7 C.F.R. § 622.14 (1976).

Both the Susquehanna⁵⁰⁶ and Delaware River Basin Commissions⁵⁰⁷ are empowered to establish standards and review projects having a substantial effect on basin waters, including major obstruction and flood control measures.⁵⁰⁸ With the exception of the Delaware River Basin Commission's recently adopted flood plain management standards,⁵⁰⁹ both commissions have relied upon general policy guidelines in reviewing new obstructions projects.⁵¹⁰ Despite somewhat vague criteria, the commission programs could potentially provide a major contribution to storm water and encroachment management in the eastern two-thirds of the Commonwealth. Unfortunately, realization of this potential is hindered by the extremely limited resources available to the basin agencies.⁵¹¹ As a result, most commission attention must remain focused on projects with interstate or basin-wide ramifications. The authority to regulate obstructions or runoff acceleration remains primarily with the states, which are often, as in Pennsylvania, similarly constrained by budget and staff shortages.

D. Erosion and Sedimentation Control

Since 1972, DER has administered regulations adopted under the Pennsylvania Clean Streams Law⁵¹² to control erosion and sedimentation resulting from earth moving activities.⁵¹³ The rules require the formulation of plans for erosion control for all earth moving⁵¹⁴ and the acquisition of permits for large projects.⁵¹⁵ Although most of the technical criteria for erosion control measures are primarily directed at pollution prevention, many of the standards relating to the collection of runoff,⁵¹⁶ sedimentation basin design⁵¹⁷ and velocity control⁵¹⁸ have a direct relation to regulation

506. Susquehanna River Basin Compact, Pub. L. 91-575, 84 Stat. 1509 (1970) (codified at PA. STAT. ANN. tit. 32, §§ 820.1-8 (Supp. 1977-78)) [hereinafter cited as SRBC Compact].

507. Delaware River Basin Compact, Pub. L. 87-328, 75 Stat. 688 (1961) (codified at PA. STAT. ANN. tit. 32, § 815.101 (Purdon 1967)) [hereinafter cited as DRBC Compact].

508. SRBC Compact §§ 3.4(2), .10, PA. STAT. ANN. tit. 32, § 820.1 (Supp. 1977-78); DRBC Compact §§ 3.6(b), .8 PA. STAT. ANN. tit. 32 § 815.101 (Purdon 1967).

509. 42 Fed. Reg. 13,541 (1977).

510. See DELAWARE RIVER BASIN COMM'N, WATER CODE DELAWARE RIVER BASIN §§ 2.100, 2.150 (1976); SUSQUEHANNA RIVER BASIN COMM'N, COMPREHENSIVE PLAN FOR MANAGEMENT AND DEVELOPMENT OF THE WATER RESOURCES OF THE SUSQUEHANNA RIVER BASIN 54, 56 (1973).

511. Interview with Peter Carlucci, Assistant to the Executive Director, Susquehanna River Basin Comm'n (August 10, 1976); Interview with David Everett, Chief, Project Rev. Branch, Delaware River Basin Comm'n (March 22, 1976).

512. PA. STAT. ANN. tit. 35, § 691.402 (Supp. 1977-78).

513. 25 PA. CODE §§ 102.1-.51 (1974).

514. *Id.* § 102.4.

515. *Id.* § 102.31(a) (applicable to projects affecting 25 acres or more).

516. *Id.* § 102.12(f).

517. *Id.* § 102.13(d).

518. *Id.* §§ 102.12(c), .13(a)(3), (b)(3), (c).

of accelerated drainage and storm water management. The program's use as a storm water management tool is enhanced by cooperative arrangements between DER, the State Conservation Commission, county conservation districts, and the SCS in administering the rules.⁵¹⁹ Several local governments and conservation districts have combined erosion control, watershed protection projects, and flood plain management into a relatively sophisticated approach to storm water problems.⁵²⁰ Unfortunately, such a holistic approach has not been adopted across the Commonwealth.

E. Flood Plain Management

The National Flood Insurance Act of 1968, as amended in 1973,⁵²¹ provides for a nationwide program of federally subsidized flood insurance, conditioned upon active management and regulation of flood plain development by state and local governments. In areas identified as flood hazard zones by HUD, no federal financial assistance for acquisition or construction purposes, including, for example, sewage treatment plans and highway grants, any loan or mortgage from a federally regulated or insured financial institution, and no federal disaster relief is authorized unless federal flood insurance is acquired.⁵²² For citizens, businesses, or government agencies to acquire the insurance, the community must be eligible for participation in the program,⁵²³ which necessitates adoption and implementation of ordinances regulating flood plain development meeting HUD standards following receipt of maps financed by the Federal Government.⁵²⁴

Although over 2,150 of Pennsylvania's 2,469 identified flood-prone municipalities have applied for participation in the federal flood insurance program,⁵²⁵ some 290 have failed to qualify for

519. Interview with Richard D. Van Noy, Chief, Div. of Conservation Districts, Bureau of Soil and Water Conservation, Pa. Dep't of Environmental Resources (July 1, 1976).

520. Particularly active programs now operate, among other places, in Bucks, Montgomery, Chester and Lancaster Counties. *Id.*

521. 42 U.S.C. §§ 4001-4127 (1970 & Supp. V 1975).

522. *Id.* §§ 4012a, 4105-4106 (Supp. V 1975); 12 C.F.R. §§ 22.0-.6; 390.0-.5, 760.0-.2 (1977); 24 C.F.R. 2200.39 (1975). It should be noted, however, that amendments to the National Flood Insurance Act, pending before Congress at the time of this publication, would remove the prohibition against loans and mortgages from federally insured or regulated financial institutions for nonparticipating communities, and instead require that notification of the flooding hazard be made to borrowers. H.R. 6655, 95th Cong., 1st Sess. § 701, 123 CONG. REC. H4296-306 (daily ed. May 11, 1977); S. 1523, 95th Cong., 1st Sess. § 312, 123 CONG. REC. S8970-71, 9042 (daily ed. June 6, 1977).

523. 42 U.S.C. § 4012 (1970).

524. *Id.* §§ 4101, 4104-4106 (1970 & Supp. V 1975); 24 C.F.R. §§ 1910.3 (1975).

525. Files of the Bureau of Community Planning Flood Insurance, Pa. Dep't of Community Affairs (as of July 18, 1977) [hereinafter cited as Files]; FED. INS. AD.,

eligibility and are now severed from the availability of flood insurance and federal assistance.⁵²⁶ A large number of communities are participating in the program under expedited emergency procedures,⁵²⁷ under which they need only adopt a resolution of intent to promulgate the necessary ordinances.⁵²⁸ However, many such municipalities have not yet adopted the required flood plain management ordinances.⁵²⁹ According to HUD estimates, approximately ten percent of Pennsylvania's communities have adopted and are implementing flood plain ordinances which comply with federal requirements,⁵³⁰ and HUD has gradually started to suspend noncomplying municipalities from the program.

As presently conducted, the federal insurance and municipal flood plain management program does not require or effectively encourage coordination of storm water and flood plan programs by all local governments located in a watershed. State statutory authority to compel comprehensive, rational management programs for all of Pennsylvania's flood-prone watersheds has been proposed,⁵³¹ but does not yet exist.

In addition to the federal flood insurance and municipal regulatory programs, both the Susquehanna and Delaware River Basin Commissions have discrete powers within the flood plain management field to conduct studies of flood plains, establish standards for development on flood plain lands, and provide technical assistance to communities for implementation of the standards.⁵³² The Susquehanna Commission has concentrated its efforts in the technical assistance area.⁵³³ While the Susquehanna Commission's authority to regulate flood plains is dependent upon the consent of the signatory state,⁵³⁴ the Delaware Commission's

U.S. DEPT OF HOUSING AND URBAN DEVELOPMENT, COMMUNITIES PARTICIPATING IN THE NATIONAL FLOOD INSURANCE PROGRAM AS OF APRIL 30, 1977, AND AREAS WHICH HAVE HAD SPECIAL FLOOD AREAS IDENTIFIED — NOT IN THE PROGRAM AS OF APRIL 30, 1977, 228-66, 400-04 (1977) (computer printout).

526. FED. INS. AD., *supra* note 525, at 404.

527. *Id.* at 266. According to HUD figures, over 90 percent of all Pennsylvania communities presently participating in the insurance program come under the "emergency" provisions. *Id.*

528. Interview with Dave Thomas, Philadelphia Regional Office, Fed. Ins. Ad., U.S. Dep't of Housing and Urban Development (August 13, 1976).

529. *Id.*

530. *Id.* As of July 1977, only 194 of Pennsylvania's flood prone communities had adopted the complete set of zoning, subdivision, and building code ordinances required for eligibility under the regular program. Files, *supra* note 525.

531. See, e.g., S.B. 743, S.B. 744, Pa. Legislature, 1977 Sess.

532. SRBC Compact § 6.2, PA. STAT. ANN. tit. 32, § 820.1 (Supp. 1977-78); DRBC Compact § 6.2, PA. STAT. ANN. tit. 32, § 815.101 (Purdon 1967).

533. See FLOOD PLAIN MANAGEMENT SUBCOMM'N, PA WATER RESOURCES COORDINATING COMM'N, INVENTORY OF PROGRAMS OF GOVERNMENTAL AND OTHER AGENCIES PERTAINING TO FLOOD PLAIN MANAGEMENT K-1 (1974).

534. SRBC Compact § 6.2(c), PA. STAT. ANN. tit. 52, § 820.1 (Supp. 1977-78).

powers are not so conditioned. Recently adopted standards establish criteria for both municipal flood plain management in the Delaware River basin and rules to guide commission review of projects located in the flood plains of the Delaware River and its major tributaries.⁵³⁵

V. CONCLUSION

At this point, one observation is clear: Pennsylvania's law relation to storm water management is a treacherous maze of largely archaic and incoherent dogmas and only partially effective institutional arrangements. Critical assessment of the major problems discussed in this article suggests the following goals and criteria that Pennsylvania's future storm water management policy must or should address.

1. *A more holistic, coordinated approach to storm water management is essential.* The storm water problem cannot be neatly segmented into questions of diffuse surface water drainage rights, water obstruction regulation, flood control, and flood plain management. These are all facets of the same basic issue: How shall storm water and its consequences be managed in order to avoid injury to persons and property and to promote important economic, social, and environmental values? This does not necessarily mean that one institution, agency, or level of government must assume exclusive control of all aspects of managing storm runoff and its consequences. It does require, however, a more integrated approach by all concerned, buttressed by clearly enunciated public policies and laws.

2. *Prior planning is a prerequisite to any rational storm water management program.* It is obvious that our current ad hoc approach to the resolution of storm water problems is self-defeating. After land development is completed, it is difficult to reverse its effects on drainage. Post-development structural remedies are almost always far more expensive and less successful than the options available if adequate prior planning had been undertaken and implemented by developers and government.⁵³⁶

3. *Storm water management policy should conserve natural drainage characteristics as part of an economically efficient and equitable program.* As a fundamental goal of storm water law, each person should be required to use his land in ways that will minimize injury to his neighbors. The prime objective in all land development should be to retain, to the maximum extent possible, natural drainage characteristics,⁵³⁷ and avoid an increase in the peak

⁵³⁵ 42 Fed. Reg. 13,541 (1977).

⁵³⁶ See A. O'DELL, *supra* note 241, at 88-91; 5 WATER RIGHTS, *supra* note 12, § 457.5.

⁵³⁷ See DVRPC REGIONAL STANDARDS, *supra* note 428; A. O'DELL, *supra* note 241; 5 WATER RIGHTS, *supra* note 12, § 457.3.

quantity and velocity of storm water discharges. Contrary to the assumptions of some early drainage cases, a rule which requires all property owners to exercise reasonable care to control runoff does not impose undue financial burdens on economic development. Creative use of natural characteristics, onsite controls, and community drainage systems can save millions of dollars in flood damages at less cost than the current unprofitable war of pipes and dikes.⁵³⁸

4. *For any solution to be successful, intermunicipal conflicts must be resolved and storm water problems must be addressed on a watershed-wide basis.* Storm water problems arise in and affect hydrologic units defined by drainage watersheds. Up to now, most of these problems have been addressed on a different basis, by municipalities acting independently and often at cross-purposes with their neighbors. No one community alone can solve the storm water management problem. Unfortunately, those municipalities which are most vulnerable often have the least control over the activities threatening their lives and property.⁵³⁹ Only a watershed approach can hope to resolve or prevent these conflicts, and assure harmonious, productive, and safe economic development in all communities.

5. *Drainage rules should retain essential flexibility while providing sufficient certainty to guide private and public development decisions.* Without a stable, clear, and understandable set of rules, private parties and public bodies cannot adequately design and tailor their decisions affecting drainage. Preventive action to avoid conflicts is discouraged by contradictory doctrines and conflicting policy pronouncements. Moreover, if Pennsylvania's law continues to provide little or no predictable security against avoidable storm water damages, the economic well-being of land investments may become increasingly uncertain.

6. *Storm water management should be sensitive to and compatible with the attainment of other water resource and environmental objectives.* Particular sensitivity should be given to the relation between storm water management and groundwater, water quality, and pollution control. If storm water management pursues the traditional course toward larger collection systems and channels to dispose of runoff as quickly as possible, there is little doubt that groundwater availability will be impaired and stream

538. See A. O'DELL, *supra* note 241, at 88-94.

539. Interview with Alan O'Dell, Chief Planner, Joint Planning Comm'n of Lehigh-Northampton Counties (August 27, 1976); *Hearings on Senate Bill No. 1122 before the Pa. House of Representatives, Comm'n on Local Gov't* (Oct. 23, 1974) (Statements of Evellen Kim and Carmin Arndt) (problems of Lewisburg Borough in managing accelerated runoff from new industrial, commercial, and residential developments in adjoining townships).

sedimentation aggravated.⁵⁴⁰ On the other hand, creative use of retention techniques, natural ponding and swale systems, and similar approaches to prevent accelerated runoff may ameliorate storm water problems, enhance recharge of groundwater aquifers, and control pollution.

7. *Storm water management considerations should be an integral aspect of land use planning and development programs.* Storm water management is both a water resource issue and a land use problem. It is not uncommon for land use planning and development regulation on the local, county, and state level to neglect considerations of storm water constraints. Until storm water management and land use planning are merged, the solution to Pennsylvania's drainage and flood problem will remain elusive.

8. *Future storm water management programs must be capable of administration and implemented through realistic manpower and budgetary resources.* The current melange of laws and programs relating to storm water management is administered by the courts and a large variety of agencies, few of which have the resources to approach realistically the problem or implement their assigned tasks.⁵⁴¹ A private citizen confronting a drainage problem is provided with virtually one alternative: to spend years and a fortune in protracted litigation with only a modest chance of effective relief. Clearly the solutions will not be simple or cheap. But with annual flood damages averaging \$100 million since 1936, an allocation of resources to effect a rational storm water program would seem an attractive public investment.

Each year, Pennsylvanians experience the frustrating dividends of storm water mismanagement. From eroded fields and inundated basements to disastrous floods, every community and watershed is confronted by and contributes to the Commonwealth's mounting drainage and flooding problem. Billions of dollars in public and private investment have flowed with the water to the sea. The technical understanding of the storm water issue and its potential solutions has advanced greatly in the first half of the twentieth century. The policies and framework of the legal and institutional bodies have been much slower to evolve and address the challenge.

540. BUREAU OF ENVIRONMENTAL MASTER PLANNING, PA. DEP'T OF ENVIRONMENTAL RESOURCES, ENVIRONMENTAL MASTER PLAN, POLICY RECOMMENDATIONS FOR CRITICAL ENVIRONMENTAL AREAS (1977).

541. The DER, for example, administers the Commonwealth's water obstructions program, including the review of over 1000 applications annually and the monitoring of over 7000 major existing obstructions, with a professional staff of only 13. The Delaware River Basin Commission has a staff of two assigned to review all major water resource projects in the basin.

Drainage and flood control problems may never be completely resolved, but common sense and rational legal reforms could greatly ameliorate the rising tide of storm water conflicts. The choice is largely up to Pennsylvania's citizens and their representatives.