

MIAMI COUNTY  
STORMWATER  
MANAGEMENT  
CONTROL  
REGULATIONS

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## **ARTICLE I GENERAL PROVISIONS**

### Section 1.1 Title

This resolution shall be cited as the Miami County Stormwater Management Control Regulations.

### Section 1.2 Statutory Authorization

- 1.21 This resolution of Miami County is adopted in accordance with and pursuant to the legal grant of authority of Ohio Revised Code 307.79 to adopt rules to abate soil erosion and water pollution by soil sediment.
- 1.22 Therefore, the Board of Commissioners of Miami County, State of Ohio, does resolve the following.

### Section 1.3 Purpose

- 1.31 The purpose of this resolution is to establish standards, principles, and procedures by which Miami County can regulate construction-oriented, earth-disturbing site development activities which cause or may cause erosion, and sediment deposition, and thereby prevent an increase in existing off-site impact potentials at lower elevations for sedimentation of lands and drainageways, siltation of drainage waters, and the flooding of watercourses.
- 1.32 Enactment of this resolution by Miami County is in partial fulfillment of its responsibility as a local Designated Management Agency to implement nonpoint source control activities set forth in the area wide water quality management plan prepared and adopted by the Miami Valley Regional Planning Commission (MVRPC) and authorized under Section 208 of the Federal Water Pollution Control Act (P.L. 92-500, 86 Stat. 816), 33 U.S.C.A. 1228, as amended by the Clean Water Act of 1977 (P.L. 95-217, 91 Stat. 1566).
- 1.33 Pursuant to Ohio amended substitute H.B. 513, which became effective on January 1, 1979 and amended chapters 307 and 1515 of the Ohio Revised Code, enactment of this resolution by Miami County constitutes replacement of Rules 1501:15-1-01 through 1501:15-1-08 of the Ohio Administrative Code (OAC) which, under OAC Rules 1501:15-1-01 and 1501:15-1-02 (B)(4) do not apply to a municipal corporation or county that has adopted provisions with similar or greater standards for urban erosion and sediment control.
- 1.34 Standards in this resolution are thus intended to protect persons and property from adverse stormwater runoff and soil erosion impacts which may be incurred during or resulting from construction site development and/or subdivisions.

### Section 1.4 Scope

- 1.41 This resolution shall apply to earth-disturbing activities on areas designated below which are within the jurisdiction of Miami County unless otherwise excluded within this resolution or unless expressly excluded by state law:

- (a) Land used or being developed for commercial, industrial, residential, recreational, public service or other non-farm purposes.

1.42 This resolution shall not apply to:

- (a) Strip mining operations regulated by Section 1513.01 of the Ohio Revised Code.
- (b) Surface mining operations regulated by Section 15.14.01 of the Ohio Revised Code.
- (c) Activities within the corporate limits of municipal corporations.

1.43 Activities subject to these Regulations, now or hereafter carried out on property contiguous to the present corporate limits of municipal corporations within the county shall be deemed in compliance with these Regulations if such activities are conducted in compliance with the then regulations of such municipal corporations pertaining to similar activities; provided, however, that should such municipal corporations have no similar regulations or plan of urban soil sediment pollution control, then such activities shall be conducted in accordance with these Regulations. For developments located within a drainage basin which drains through the municipal corporation limits, the Approving Agency may confer with the municipal engineer to assist in making a determination whether to apply the county drainage standards or the municipal drainage standards. However, it shall be the Approving Agency's determination in all such matters.

#### Section 1.5 Disclaimer of Liability

No provision of this resolution shall limit, increase, or otherwise affect the liabilities of the person effecting the development of land for himself or for another nor impose any liability upon this jurisdiction not otherwise imposed by law.

#### Section 1.6 Severability

If any clause, section, or provision of this resolution is declared invalid or unconstitutional by a court of competent jurisdiction, validity of the remainder shall not be affected thereby.

#### Section 1.7 Effective Date

This resolution shall become effective within Miami County on and after February 28, 1987.

## **ARTICLE II DEFINITIONS**

For the purpose of this resolution, certain rules or word usage apply to the text as follows:

- (1) Words used in the present tense include the future tense; and the singular includes the plural, unless the context clearly indicates the contrary.
  - (2) The term “shall” is always mandatory and not discretionary; the word “may” is permissive.
  - (3) The word or term not interpreted or defined by this article shall be used with a meaning of common or standard utilization, so as to give this resolution its most reasonable application.
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- 2.01 Approving Agency – means the governing body of the county or its duly designated representative. The Miami County Board of Commissioners hereby designated the Office of the Miami County Engineer to be the Approving Agency for Miami County, Ohio, until further notice.
  - 2.02 Channel – means a natural stream that conveys water; a ditch or channel excavated for the flow of water.
  - 2.03 Developer – means any person commencing proceedings under this resolution to effect the development of land for himself or for another.
  - 2.04 Development – means the division of land into two or more parcels, the carrying out of any building, or the making of any material change in the use or appearance of any structure or land through activities of construction, erection, or alteration.
  - 2.05 Development Area – means any contiguous (abutting) area owned by one person or operated as one development unit and used or being developed for non-farm commercial, industrial, residential, or other non-farm purposed upon which earth-disturbing activities are planned or underway.
  - 2.06 District – means a soil and water conservation district, organized under Chapter 1515 of the Ohio Revised Code.
  - 2.07 Ditch – means an open channel either dug or natural for the purpose of drainage or irrigation with intermittent flow. (See stream, drainageway, and grassed waterway.)
  - 2.08 Drainageway – means an area of concentrated water flow other than a river, stream, ditch, or grassed waterway.
  - 2.09 Dumping – means the grading, pushing, piling, throwing, unloading, or placing of earth material.

- 2.10 Earth-Disturbing Activity – means any grading, excavating, filling, or other alteration of the earth’s surface where natural or man-made ground cover is destroyed and which may result in or contribute to erosion and sediment pollution.
- 2.11 Earth Material – means soil, sediment, rock, sand, gravel, and organic material or residue associated with or attached to the soil.
- 2.12 Erosion – means:
- (1) Accelerated Erosion – erosion much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of the activities of man.
  - (2) Floodplain Erosion – abrading and wearing away of the nearly level land situated on either side of a channel due to overflow flooding.
  - (3) Gully Erosion – the erosion process whereby water accumulates in narrow channels during and immediately after rainfall or snow or ice melt and actively removes the soil from this narrow area to considerable depths such that the channel would not be obliterated by normal smoothing or tillage operations.
  - (4) Natural Erosion (Geologic Erosion) – the wearing away of the earth’s surface by water, ice, or other natural environmental conditions of climate, vegetation, etc., undisturbed by man.
  - (5) Normal Erosion – the gradual erosion of land used by man which does not greatly exceed natural erosion.
  - (6) Rill Erosion – an erosion process in which numerous small channels only several inches deep are formed; occurs mainly on recently disturbed soils.
  - (7) Sheet Erosion- the removal of a fairly uniform layer of soil from the land surface by wind or runoff water.
- 2.13 Grassed Waterway – means a broad and shallow natural course or constructed channel with erosion resistant grasses or similar herbaceous cover which is used to conduct surface water drainage runoff at non-erosive velocities.
- 2.14 Landslide – means the rapid downward and outward movement of large rock material and/or soil mass under the influence of gravity in which the movement of the soil mass occurs along an interior surface of sliding.
- 2.15 Person – means any individual, corporation, partnership, joint venture, agency, subdivider, firm, association, trust, syndicate, municipal corporation, county, state agency within Ohio, the Federal government, other legal entity, or any combination thereof.

- 2.16 Public Waters – means water within rivers, streams, ditches, and lakes, except private ponds and lakes wholly within single properties, or waters leaving property on which surface water originates.
- 2.17 Sediment – means soil material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by wind, water, gravity, or ice, and has come to rest on the earth's surface above or below sea level.
- 2.18 Sediment Basin – means a barrier, dam, or other suitable detention facility built across an area of water flow to settle and retain sediment carried by surface drainage runoff waters.
- 2.19 Sediment Control Plan – means a written description, acceptable to the Approving Agency, of methods for controlling sediment pollution from accelerated erosion on a development area of **one** or more contiguous acres or from erosion caused by accelerated runoff from a development area of **one** or more contiguous acres.
- 2.20 Sediment Pollution – means failure to use management or conservation practices to abate wind or water erosion of the soil or to abate the degradation of the waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil-disturbing activities on land used or being developed for non-farm commercial, industrial, residential, or other non-farm purposes.
- 2.21 Site – means any lot or parcel of land or a series of lots or parcels of land adjoining or contiguous or joined together under one ownership where clearing, stripping, grading, or excavating is performed.
- 2.22 Slip – means landslide as defined above.
- 2.23 Sloughing – means a slip or downward movement of an extended layer of soil over a slope frequently resulting from the undermining action of surface water runoff or the earth-disturbing activity of man.
- 2.24 Soil Loss – means soil relocated on or removed from a given site by the forces of erosion and the redeposit of the soil at another site on land or in a body of water.
- 2.25 Storm Frequency – means the average period of time in years within which a storm of a given duration and intensity can be expected to be equaled or exceeded.
- 2.26 Stream – means a body of water running or flowing on the earth's surface or channel in which such flow occurs. Flow is continuous or may be seasonally intermittent.
- 2.27 Topsoil – means surface and upper surface soils which presumably are darker colored, fertile soil materials, ordinarily rich in organic matter or humus debris.

**ARTICLE III**  
**URBAN SOIL SEDIMENT POLLUTION REGULATIONS**

Section 3.1 Requirements

No person shall cause or allow earth-disturbing activities on a development area except in compliance with the standards and criteria set out in Section 3.3 and the applicable item (a) or (b) below:

- (a) When a proposed development area consists of **one (1)** or more acres and earth-disturbing activities are proposed for the whole area or any part thereof, the responsible person shall develop and submit for review a sediment control plan prior to any earth-disturbing activity. Such a plan must contain sediment pollution control practices so that compliance with other provisions of this resolution will be achieved during and after development. Such a plan shall include specific requirements established by the Approving Agency and be filed with the Approving Agency.
  
- (b) When a proposed development area involves less than **one (1)** acre, it is not necessary to submit a sediment control plan; however, the responsible person must comply with the other provisions of this resolution. All earth-disturbing activities shall be subject to surveillance and site investigation by the Approving Agency to determine compliance with the standards and regulations. The Approving Agency may require the responsible person to submit information deemed necessary to determine compliance.

Section 3.2 Exceptions

3.21 Any person seeking approval to construct a single-family residence shall be exempted from having to prepare a sediment control plan provided they:

- (a) Construct upon one lot or parcel at a time, and there is no other construction occurring simultaneously on land or property within five hundred feet (500') of the proposed development site; and
  
- (b) Do not disrupt, alter, or expose more than ten thousand (10,000) square feet of the existing natural surface of the total development site at a time; and
  
- (c) Submit and follow a standard policy for controlling runoff erosion and sediment impacts foreseeable to result during and from site development which is acceptable to the Approving Agency.

Exemption under this section of any person for the preparation and submission of a sediment control plan does not, however, exempt them from complying with the other provisions of this resolution. The Approving Agency may require the responsible person to submit information deemed necessary to determine compliance.

3.22 No sediment control plan shall be required for public road, highway, other transportation, or drainage improvement, or maintenance thereof, undertaken by a government agency or entity if such agency or entity plans to follow a statement of sediment control policy which has been submitted by the sponsoring agency or entity and approved by the Miami County Board of Commissioners.

### Section 3.3 Standards and Criteria

- 3.31 Sheet and Rill Erosion – To control pollution of public waters by soil sediment from accelerated sheet and rill erosion on development areas, the responsible person shall:
- (a) Construct and maintain sediment basins sized in accordance with the United States Soil Conservation Service Handbook, “Water Management and Sediment Control for Urbanizing Areas” (Washington, D.C., U.S. Government Printing Office, June 1978); or
  - (b) Apply and maintain a level of management and conservation practices such that the predicted average annual soil loss, accumulated monthly in accordance with the procedure in the United States Soil Conservation Service handbook, “Water Management and Sediment Control for Urbanizing Areas”, is less than fifteen (15) tons per acre the first year commencing from the time of initial earth-disturbance, ten (10) tons per acre the second year, and five (5) tons per acre for any other year of the development process. The management and conservation practices shall be designed, applied, and maintained so that the entire development area and any part thereof is protected from accelerated erosion in accordance with the stated criteria; or,
  - (c) Use other methods to control sediment pollution; this may include but is not limited to a combination of paragraphs (a) and (b) of this standard, provided those methods are acceptable to the Approving Agency.
- 3.32 Concentrated Water Erosion – To control pollution of public waters by soil sediment from accelerated erosion in drainageways and grassed waterways and in streams and ditches disturbed or modified in conjunction with the development process on a development area, the responsible person shall:
- (a) Design, construct, and maintain concentrated water flow channels such that the velocity of flow does not exceed the permissible velocities listed in Appendix A; or,
  - (b) Design, construct, and maintain sediment basins sized in accordance with the United States Soil Conservation Service handbook, “Water Management and Sediment Control for Urbanizing Areas”; or
  - (c) Use other methods to control sediment pollution; this may include but is not limited to a combination of paragraphs (a) and (b) of this standard, provided those methods are acceptable to the Approving Agency.
- 3.33 Sloughing, Landsliding, and Dumping – To control sediment pollution of public waters caused by sloughing, landsliding, or dumping of earth material, or placing of earth material into such proximity that it may readily slough, slide, or erode into public waters by natural forces, no person shall:
- (a) Dump or place earth material into public waters or into such proximity that it may readily slough, slide, or erode into public waters unless such dumping or placing is authorized by the Approving Agency for such purposes as, but not limited to, constructing bridges, culverts, erosion control structures, and other in-stream or channel bank improvement works; or,

- (b) Grade, excavate, fill, or impose a load upon any soil or slope known to be prone to slipping or landsliding, thereby causing it to become unstable, unless qualified engineering assistance has been employed to explore the stability problems and make recommendations to correct, eliminate, or adequately address the problems. Grading, excavating, filling, or construction shall commence only after the Approving Agency has reviewed and approved the exploratory work and recommendations and only in accordance with the approved recommendations.

3.34 Stream Channel and Flood Plain Erosion – To control pollution of public waters by soil sediment from accelerated stream channel erosion and to control flood plain erosion caused by accelerated stormwater runoff from development areas, the increased peak rates and volumes of runoff shall be controlled such that:

- (a) The peak rate of runoff from the developed area shall not exceed the peak rate of runoff occurring on the same area under pre-developed conditions for an equivalent size storm.
- (b) Consideration of the one (1), two (2), five (5), ten (10), twenty-five (25), fifty (50), and one hundred (100) year storm frequencies of twenty-four (24) hour duration will be considered adequate in designing and developing to meet this standard.
- (c) Special consideration shall be given to those areas which may be susceptible to downstream erosion resulting from the “point discharge” of stormwater as it exits the developed area.

Methods for controlling increases in stormwater runoff peaks and volumes may include but are not limited to:

- (a) Retarding flow velocities by increasing friction; for example, grassed road ditches rather than paved street gutters where practical (low density development areas, access roads, etc.); discharging roof water to vegetated areas; or grass and rock lined drainage channels;
- (b) Grading and construction of terraces and diversions to slow runoff and use of grade control structures to provide a level of control in flow paths and stream gradients;
- (c) Induced infiltration of increased stormwater runoff into the soil where practical; for example, constructing special infiltration areas where soils are suitable; retaining topsoil for all areas to be re-vegetated; or providing good infiltration areas with proper emergency overflow facilities; and,
- (d) Provisions for detention and retention; for example, permanent ponds and lakes with stormwater basins provided with proper drainage, multiple use areas for stormwater detention and recreation, wildlife, transportation, fire protection, aesthetics, or subsurface storage areas.

## **ARTICLE IV ADMINISTRATION**

### Section 4.1 Sediment Control Plan Content and Filing

- 4.11 Every person required to submit a sediment control plan pursuant to Section 3.1 (a) of these Regulations shall submit one (1) original and one (1) copy of such plan to the Approving Agency and obtain the authorizations required by these Regulations prior to entering into any earth-disturbing activity.
- 4.12 Such plan, which shall be accompanied by a map or maps of the proposed development area or areas, drawn to a scale of one inch (1") equals one hundred feet (100'), shall contain the following information:
- (a) Location of the area and its relation to its general surroundings including but not limited to:
    - (1) Off-site areas susceptible to sediment deposits or to erosion caused by accelerated runoff,
    - (2) Off-site areas affecting potential accelerated runoff and erosion control;
  - (b) Existing topography of the development area and adjacent land within one hundred feet (100') of the boundaries. The topographic map shall contain existing contours at an interval of not greater than two feet (2') if the slope of the ground is twelve percent (12%) or less and not greater than five feet (5') where the slope is more than twelve percent (12%) to clearly portray the conformation and drainage pattern of the area;
  - (c) The location of existing buildings, structures, utilities, water bodies, drainage facilities, vegetative cover, paved areas (roads, streets, driveways, sidewalks, etc.) and other significant natural or man-made features on the development area and adjacent land within one hundred feet (100') of the boundaries;
  - (d) A general description of the predominant soil types, their location, and their limitations for the proposed use (refer to the Soil Survey of Miami County, Ohio, issued January 1978);
  - (e) Proposed use of the development area including present development and ultimate utilization with detail on soil cover, both vegetative and impervious;
  - (f) All proposed earth disturbance including:
    - (1) Areas of excavation, grading, and filling;
    - (2) The finished grade, stated in feet horizontal to feet vertical, of cut and fill slopes;
    - (3) Kinds of utilities and proposed areas of installation;

- (4) Proposed paved and covered areas in square feet or to scale on a plan map;
- (5) Makeup of proposed surface soil (upper six inches) on areas not covered by buildings, structures, or pavement. Description shall be in such terms as: original surface soil, subsoil, sandy, heavy clay, stony, etc.;
- (6) Proposed kind of cover on areas not covered by buildings, structures, or pavement. Description shall be in such terms as: lawn, turfgrass, shrubbery, trees, forest cover, rip-rap, mulch, etc.;
- (g) Provisions for temporary and permanent erosion control:
- (h) Provisions for the management of stormwater, derived both on-site and from upper watershed areas, including the control of accelerated on-site runoff, to a stable receiving outlet;
- (i) Provisions for maintenance of temporary and permanent erosion control improvements during construction;
- (j) Provisions for maintenance of control facilities including easements or agreements to insure short as well as long term erosion and sediment pollution control and stormwater management;
- (k) Proposed construction sequence, a time schedule for all earth-disturbing activities and installation of provisions for erosion and stormwater management;
- (l) Design computations and applicable assumptions for all structural measures for erosion and sediment pollution control and water management. Volume and velocity of flow must be given for all surface water conveyance. This information shall also be provided for surface water outlets;
- (m) Seeding mixtures and rates, lime and fertilizer application rates, and kind and quantity of mulching for both temporary and permanent vegetative control measures;
- (n) Estimate of cost of erosion and sediment control and water management structures and features;
- (o) Title, scale, direction, legend, and date of all plan maps;
- (p) Names and addresses of the person(s) preparing the plan, the owner, and the person responsible for the development area;
- (q) Certification that all earth disturbance, construction, and development will be done pursuant to the plan.

- 4.13 The Approving Agency may waive specific requirements for plan detail or may require additional information to show that work will conform to basic requirements of this resolution.
- 4.14 The Approving Agency shall, within five (5) calendar days of submission of such plan, transmit copies thereof to the Miami County Soil and Water Conservation District.
- 4.15 Within fifteen (15) calendar days of receipt of each such plan, the Miami County Soil and Water Conservation District shall submit to the Approving Agency its comments and recommendations thereto.
- 4.16 The Approving Agency may indicate its status of compliance or non-compliance without the recommendations and comments of the Miami County Soil and Water Conservation District, should such District fail to submit such comments and recommendations within the time hereinabove provided.

#### Section 4.2 Plan Review

The Approving Agency shall, within thirty (30) calendar days of receipt of a sediment control plan, indicate its status of compliance or non-compliance to the person who filed the plan. Indication of non-compliance shall include the plan deficiencies and the procedures for filing a revised plan. Pending preparation and determination of a status of compliance of a revised plan, earth-disturbing activities shall proceed only in accordance with conditions outlined by the Approving Agency.

#### Section 4.3 Inspection to Ensure Compliance

- 4.31 The Approving Agency may inspect development areas to determine compliance with these Regulations. If it is determined that a violation of these Regulations exists, the owner or his appointed representative shall be notified of the deficiencies or non-compliance by the Approving Agency in writing by certified mail. If within two (2) weeks after receipt of such letter, the deficiency or non-compliance has not been corrected or plans have not been approved by the Approving Agency for its correction, said deficiency or non-compliance shall be reported to the Miami County Board of Commissioners for consideration.
- 4.32 If the Miami County Board of Commissioners determines that a violation exists and requests the Prosecuting Attorney of Miami County in writing, the Prosecuting Attorney shall seek an injunction or other appropriate relief to abate excessive erosion or sedimentation and secure compliance with these Regulations. In granting relief, the court may order the construction of sediment control improvements or implementation of other control measures.
- 4.33 A final inspection shall be made to determine if the criteria of these Regulations have been satisfied.

#### Section 4.4 Appeals

Any person aggrieved by an order, requirement, determination, or any other action or inaction in relation to this regulation may appeal to the court of common pleas. Such an appeal shall be made within twenty (20) days of the date of an order or decision and shall specify the grounds for appeal.

#### Section 4.5 Maintenance

- 4.51 When permanent runoff control installations are necessary, the maintenance responsibility shall be determined by the Approving Agency. The maintenance responsibility of said installation(s) will be either by Miami County, through appropriate sections of the Ohio Revised Code, or privately maintained by the property owner or a group of property owners.
- 4.52 Maintenance by Miami County – When determined appropriate by the Approving Agency, the person(s) developing a site shall petition the County for the maintenance of permanent runoff control installations through Chapter 6131 of the Ohio Revised Code, provided such required installations:
- (a) Benefit two or more property owners; and
  - (b) Are designed for cost-effective maintenance.
- 4.53 Maintenance by the Property Owner or Group of Property Owners – When determined appropriate by the Approving Agency, permanent runoff control installations which are to be privately maintained by the property owner or a group of property owners shall be:
- (a) Designed and constructed by the person(s) developing the site with easements or agreements sufficient to allow adequate access for inspections and corrective actions, if necessary, by the Approving Agency;
  - (b) Regularly inspected by the Approving Agency to insure that privately-maintained installations are properly maintained and, if not, maintained at the expense of the responsible owner(s) by order of the Approving Agency. In any controversy arising between the owner(s) and the Approving Agency regarding the maintenance of said installations, the decision of the Approving Agency shall be final; and
  - (c) Maintained as installed by the person(s) developing the site according to the approved design and not altered unless approved by the Approving Agency.
- 4.54 Should the maintenance of any permanent runoff control installations be within a subdivision plat, the maintenance responsibilities shall be described on the record plat of said subdivision.

**ARTICLE V**  
**ENFORCEMENT**

Enforcement of the provisions of this resolution is limited to a judicially-imposed injunction or other appropriate relief including court-ordered implementation of sediment control measures. However, nothing herein contained shall prevent Miami County from taking such other lawful action as is necessary to prevent or remedy any violation.

**APPENDIX A**  
**TABLE OF PERMISSIBLE VELOCITIES FOR FLOWING WATER**

Maximum Velocities for Grassed Waterways

Cover	Slope Range <u>2/</u> (percent)	Permissible Velocity <u>1/</u> Erosion Resistant Soils (feet/second)	Easily Eroded Soils (feet/second)
Kentucky Bluegrass	0 – 5	7	5
Tall Fescue	5 – 10	6	4
Smooth Brome	over 10	5	3
Grass Mixtures	<u>2/</u> 0 – 5	5	4
Reed Canary	5 – 10	6	3
Redtop	<u>3/</u>		
Red Fescue	0 – 5	3.5	2.5

- 1/ Use velocities exceeding five (5) feet per second only where good cover and proper maintenance can be obtained.
- 2/ Do not use on slopes steeper than ten percent (10%) except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
- 3/ Do not use on slopes steeper than five percent (5%) except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

**Drainage Field Ditches**

Drainage field ditches are shallow graded ditches with flat side slopes which do not interfere with tillage operations. Generally, the side slopes range from 8:1 to 15:1. The purpose of drainage field ditches is to collect water from depressional or nearly flat areas within a field and remove it to a stable outlet.

Generally, erosive velocities will not be a problem because of the low gradient of fields in which drainage field ditches are used and because of the shallow side slopes. Maximum velocities shall be limited to 2.5 feet/second unless on-site studies show that higher velocities will not result in erosive conditions.

**Maximum Velocities for Vegetated Stream Channels**

(a) Drainage Areas Less Than One Square Mile

The maximum permissible design velocity shall be based on site conditions and shall be such as to result in stability of the ditch bottoms and side slopes. Maximum permissible velocities will be computed using bank-full stage or ten (10) year frequency stage, whichever is lower. The following table will be used as maximum velocity for all drainage main or lateral designs. Vegetation will be established immediately after construction.

<u>Subsoil Texture</u>	<u>Maximum Velocity <sup>1/</sup> (feet/second)</u>
Sand and sandy loam (non colloidal)	2.5
Silt loam (also high lime clay)	3.0
Sandy clay loam	3.5
Clay loam	4.0
Stiff clay, fine gravel, & graded loam to gravels	5.0
Graded silt to cobbles (colloidal)	5.5
Shale, hardpan, coarse gravel	6.0

<sup>1/</sup> Channels that cannot be designed to meet the maximum velocity limitations must be stabilized with materials other than vegetation. Such materials include crushed rock, concrete, gabions, etc.

(b) Drainage Areas Greater Than One Square Mile

Channel velocities for newly constructed channels with drainage areas in excess of one square mile shall meet special stability requirements contained in U.S. Soil Conservation Service Technical Guide (Technical Release 25, Planning and Design of Open Channels).