

## **ARTICLE IV**

### **IMPROVEMENT PLANS**

#### **Section ST 401**

##### **General**

(a) There shall be submitted, for review and approval by the County Public Works Director, drainage area maps, design calculations and detailed construction drawings for:

- (1) the proposed storm drainage system;
- (2) any flood studies required to resolve potential flooding problems created by the new development;
- (3) any detention or retention basins, when required (see Section ST 405, 711 and 712);
- (4) Additional requirements refer to Articles VII through XI and Exhibit No. 36.

(b) The improvement plans must respect any flooding problems. The one hundred (100) year flood, using the criteria established in Articles VII and VIII, shall apply. Flood plain limits and flood elevations shall be shown on the grading plan and profile if the project is in a flood prone area. Said flood prone areas include all Regulatory Flood Plains and areas subject to excessive backwater.

(c) Refer to Article XI for additional information on the review and approval procedures by the County Public Works Director for all new developments, including subdivisions. Refer to Article XII for information relative to inspection of the storm drainage systems on any new developments, including subdivisions that have been reviewed and approved by the County Public Works Director.

(d) Exhibit No. 3, "Check List Design Aid", may be used as an aid by the Developer/Owner/Engineer/Architect in the development of improvement plans. Hopefully, this design aid, if applied, will minimize review time, and prevent unnecessary delays in receiving approval for any project. Any other requirements in these Rules and Regulations for plan development that is not shown on the check list must be included.

#### **Section ST 402**

##### **Preparation of Subdivision Improvement Plans**

(a) In addition to all the requirements for submitting improvement plans as indicated under these Rules and Regulations, any of the following items applicable to the new development must also be included in the plans:

- (1) Drawings shall be standard size 24"x36", with a legible title block.

(2) Location and profiles of the sewers, detention and/or retention basins, drainage channels and watercourses, pump stations, structures, or any other storm drainage item shall be shown thereon.

(3) All existing and proposed topography and contours, including the proposed contours of any new roadways, parking lots, drives, etc, that are to be constructed.

(4) Existing driveways, water mains, valve boxes and basins, sanitary sewers, gas mains, electric power and telephone facilities, fire hydrants and other structures. All proposed features as required by the Metropolitan Sewer District shall also be a part of the detailed drawings.

(5) Drawings of pump stations, structures, detention and/or retention basins shall be shown in sufficient detail to permit a contractor to construct the facility without requiring supplemental drawings. Reference to the use of State of Ohio Standard Construction Drawings and County Public Works Director Standard Plate Drawings is acceptable if no modifications of the standard drawings are necessary.

(b) In submitting flood studies on proposed storm sewer systems for review and approval, provide the information requested in Section ST 1104 and other applicable sections of these Rules and Regulations.

(c) Provide plan and profiles of existing and proposed sanitary, storm or combined sewers, with elevations, lengths, grades, pipe sizes and pipe type. Show manholes, catch basins or other connections to any of these systems, some of which may be beyond the boundaries of the new development. Show plans, profiles and cross sections of all proposed watercourses and drainage channels, to be altered or improved.

(d) All downspout collector lines and all individual downspout and sump pump taps are to be shown on the subdivision improvement plans.

### **Section ST 403**

#### **Floodplain Limits in the Special Flood Hazard Areas**

The following scientific and engineering reports, and accompanying maps and profiles, identify in whole or in part, the special flood hazard areas, as defined in Section ST 150, within unincorporated Hamilton County, Ohio and shall be used to determine the elevation and extent of these areas subject to flooding.

(a) Storm Drainage and Open Space Master Plan for Hamilton County, Ohio (Consoer, Townsend and Associates, December 1966).

(b) Flood Insurance Study for the County of Hamilton, Ohio (Federal Emergency Management Agency, December, 1981, and as amended).

(c) Flood Boundary and Floodway Map for Unincorporated Hamilton County, Ohio, June 1, 1982 and as amended.

(d) Flood Insurance Rate Map for Unincorporated Hamilton County, Ohio, June 1, 1982, and as amended.

Where The FEMA Flood Insurance Study and The Consoer/Townsend Storm Drainage and Open Space Master Plan provide information for the same reaches of streams, the information which is more restrictive as to elevation, extent, and discharge shall be used. If Consoer/Townsend is most restrictive, and it can be demonstrated through engineering analysis to be in error, the firm flood study information shall be used.

#### **Section ST 404**

##### **Grading of Sites and Improvements**

Where feasible, there shall be sufficient difference in elevation between roadway grades and adjoining building sites so that roadway gutters can serve as runoff channels to supplement the storm sewers. Special care must be taken at the roadway low sag areas and low point cul-de-sacs to prevent flooding of buildings in these areas (refer to Sections ST 406(a)(4)(v), 707, 808 and 1104(d)(1) and (2) for addition information.

#### **Section ST 405**

##### **Detention and/or Retention Basins**

(a) Detention/Retention basins shall be required for every new development project and also, for renovation and replacement projects, where no detention has previously been provided. Pre-development runoff coefficient  $c=0.90$  for existing impervious area of renovation and replacement shall be adjusted to  $c=0.45$  for detention facility calculation purposes.

(b) If the volume of required storage, for detention or retention, is calculated, per Sections ST 711 and 712, to be eight hundred fifty (850) cubic feet or less (except that the one hundred (100) year frequency storm is to be used for both the pre & post conditions), the requirement for detention or retention will be waived unless known drainage problems exist immediately downstream of the project as determined by Public Works.

(c) Where two (2) or more existing watercourses, with separate, contributing drainage areas, discharge runoff at different locations in any new development, two (2) or more detention and/or retention basins may be required. The Developers/Engineers shall initially follow the procedures indicated in Section ST 1102 to determine how many detention and/or retention basins will be required.

(d) A Home Owner's Association (HOA) is responsible for the maintenance of all detention basins within subdivisions. The maintenance responsibility will be transferred to the proportional distribution of the property owners within the development if the

(HOA) is dissolved. If a Home Owner's Association (HOA) is not formed the maintenance responsibility will be the proportional distribution of the property owners within the development.

(e) The County Public Works Director will request from the Building Commissioner that no Final Certificate of Occupancy be issued for any single building permit development requiring a detention and/or retention basin if the site of the basin has not been completely constructed (as determined by the Director of Public Works), and approved, or constructed to the extent necessary to control the runoff generated by the portion of the development constructed, and a record plat or easement plat recorded. This procedure shall be used on any development, if considered necessary by the County Public Works Director. See Section ST 1201(c).

## **Section ST 406**

### **Easements, Plats and Right-of-Entry Agreements**

(a) Easements: Utility and drainage easements shall be provided where necessary. Whenever a proposed storm sewer, drainage channel or drainage structure is located on public or private property, they shall follow lot lines, with easements, if feasible. The public agency or Owner responsible for maintenance of the storm drainage system must have free access to and use of the easements at any time. See Section ST 132, 133, 135 and 140 for definitions of various easements.

(1) The minimum acceptable width for a public storm sewer easement is fifteen (15) feet. The County Public Works Director may require, for maintenance purposes, wider easements than those shown on the following tables, whenever storm sewer depth becomes excessive, or whenever any building foundation may be located too close to the easement creating a potential undermining condition to the building in the event of future excavation for storm sewer maintenance or other purpose.

When construction of a proposed storm sewer system is to be provided in adjacent property and connected to a storm sewer system that is to be publicly maintained in any new development, a public easement having a width in accordance with Section ST 407(a)(1) or (2) must be obtained, by the Developer, from the adjacent property owner.

(2) Use the following table for establishing public storm sewer easement widths when including "Restrictions on Sewer Easements"

Note 20 (see EXHIBIT No. 1, Sheet 3 of 7) on the development plans.

PIPE SIZE	EASEMENT WIDTH
Under 24"	15' = 10' to centerline sewer on one side + 5' to centerline sewer on other side
24" to 60"	20' = 15' to centerline sewer on one side + 5' to centerline sewer on other side
60" or Greater	Width or diameter of sewer + 15' + adjustment to greater next highest 5' increment width diameter.
Example: For 72" dia. pipe, min. easement Width = 6' + 15' = 21' Use 25' Easement Width	

For any pipe size easement width shown above, The Hamilton County Director of Public Works may determine that an increase is required for maintenance purposes, etc.

(3) Public or private drainage easement limits for existing watercourses, swales, drainage channels, etc., shall be made wide enough to adequately protect, widen, deepen or otherwise improve the existing watercourses, drainage channels, etc., for drainage purposes, as indicated on the grading plan. In general, the smaller existing watercourses, swales and drainage channels that are to remain in new developments and are located in two (2) or more lots, are to be shown with minimum 20' wide private drainage easement lines, 10 on each side of the flow line. Larger existing watercourses and drainage channels shall have easements wider than 20' as indicated in Section ST 804(1).

(4) Private drainage easements are to be shown on development improvement plans for the following conditions:

(i) Where there are existing watercourses and two (2) or more lots involved, extend the easements to the development limits when the watercourses continue beyond the development.

(ii) Determine the location of new swales, ditches, drainage channels, etc., from the proposed grading plan. For two (2) or more lots involved, provide the easements and extend to the development limits or to an internal lot line, if it applies.

(iii) From the end of the rock channel protection at a storm sewer outlet, provide a private drainage easement along the existing watercourse, swale and/or drainage channel and extend to the development limits when two (2) or more lots are involved (refer to Section ST 809 regarding storm sewer

outlet locations).

(iv) From the inlet end of a storm sewer system where an existing watercourse, swale or drainage channel extends upstream, and when two (2) or more lots are involved, provide a private drainage easement and extend the easement upstream to the development limits, or extend the easement upstream to an internal lot line whenever the existing watercourse swale or drainage channel does not extend to the development limits. (Refer to Section ST 808 regarding storm sewer inlet locations).

(v) New development plans with proposed surface ditches provided for storm water overflow due to potential flooding at roadway low sag areas, low point cul-de-sacs or other practical locations must include a minimum ten (10) foot wide private drainage easement. (Refer to Section ST 707, 808 and 1104(d)(1) and (2) for additional information).

(vi) New developments, where two (2) or more lots are involved, that require detention and/or retention basins that are to be privately maintained, must indicate private drainage easement limits and the physical dimensions that control the size and depth of the basin/s on the improvement plans. (See Section ST 407(b)(2), (5) and (6), and 1104(e)(3) and (4) for additional information).

(b) Plats: For all new development requiring review and approval by the County Public Works Director, the following applies:

(1) An Easement Plat or Record Plat requiring public maintenance of proposed storm sewers, structures, detention and/or retention basin, channels, roadways, etc., must be prepared, sealed and signed by the Developer's Surveyor and must be notarized; then reviewed and approved by the County Public Works Director and then recorded by the Developer. (Refer to Section 406(b)(6) also).

(2) An easement plat requiring private maintenance of private storm sewers, structures, detention and/or retention basins, channels, etc., that extends through two (2) or more privately owned lots must be prepared, sealed and signed by the Developer's Surveyor and must be notarized; then reviewed and approved by the County Public Works Director and then recorded by the Developer. (Refer to Section ST 406(b)(6) also).

(3) A record plat requiring private maintenance of any private detention and/or retention basin, including all graded areas related to the basin that

lies wholly within a single lot, must be prepared, sealed and signed by the Developer's Surveyor and must be notarized; then reviewed and approved by the County Public Works Director and then recorded by the Developer. (See Section ST 406(b)(5), (6) and (7) also).

(4) For miscellaneous work required to be performed by a Developer in conjunction with an existing storm drainage system that is publicly maintained, such as a new storm sewer connection, relocation, replacement, etc., the County Public Works Director will determine whether or not the Developer must prepare a plat to expand the existing easement.

(5) A registered surveyor's signature and seal is required on any easement, record or dedication plat that has a detention and/or retention basin. A metes and bounds location of the private storm drainage limits completely surrounding any detention and/or retention basin and the storage volume required for any basin must be shown on the plat.

(6) After any plat is recorded by the Owner, or Engineer, the Developer is responsible for providing the County Public Works Director a print of the recorded record plat for filing.

(7) All plats for private detention and/or retention facilities must be recorded prior to the issuance of a Certificate of Occupancy for associated buildings.

(c) Right-of-Entry Agreements: When it has been determined by the County Public Works Director that in a new development an easement and/or plat is not required by a Developer where construction is necessary on adjacent property, the Developer must obtain a Temporary Right-of-Entry Agreement from the adjacent property owner to perform all necessary work for constructing any approved storm drainage system that involves any use of the adjacent property, including grading. The temporary Right-of-Entry Agreement shall describe all the work required to be performed. In addition, a sketch or plan, including profile and sections, if necessary, and drawn to scale, must be provided by the Developer showing the work required to be performed. The Agreement must be signed, witnessed and notarized by the Property Owner(s) and the Developer(s), then submitted to the County Public Works Director before commencement of construction.

## **Section ST 407**

### **Relation of Development to Existing Watercourses and Drainage Channels**

(a) The development shall be appropriately related to natural and artificial drainage features. The development layout shall include the existing watercourses, proposed drainage channels, the one hundred (100) year regulatory floodway and/or flood plain limits, detention and/or retention basins, if required, and all other storm drainage items. The watercourses and drainage channels, where practical, shall be

located along the rear or outer limit property lines of the development.

(b) All swales and small upper reaches of existing watercourses should be integrated with the proposed system of drainage channels and storm sewers.

(c) Refer to Section ST 804(k) for additional information.

### **Section ST 408**

#### **Relation of Development between Existing Watercourses, Drainage Channels and Proposed Roadways**

(a) Where it is deemed necessary, when a proposed roadway parallels or is located near an existing watercourse or drainage channel, profiles at the top of each bank, flow line and one hundred (100) year flood, and cross sections shall be provided. Also, show the proposed roadway grade in relation to these profiles and cross sections. Sufficient cross sections must be provided to verify conformance to Sections ST 404, 406 and 418.

(b) Roadway construction should not encroach on the flood plain limits of an existing watercourse or drainage channel. (See Sections ST 404, 406, 418 and 1102(b) for additional information).

(c) Existing and proposed contours should be shown in sufficient detail to verify and confirm the profiles and cross sections.

### **Section ST 409**

#### **Storm Sewer Profiles**

Storm sewers shall be shown in profile with the following information:

(a) Profile of existing ground at storm sewer centerline if not following or along the street.

(b) Profile of proposed finished grade, if not following or along the street.

(c) Percent of grade of proposed storm sewer.

(d) Size, type, length, and invert elevations of proposed pipe or structure.

(e) Show roadway catch basins, manholes, and special structures, together with proposed elevations of their inverts, any proposed taps, rims and/or grates. Also, show window and top or grate elevations for field inlets not located under a roadway.

(f) Where an existing watercourse is being filled in and replaced with a storm sewer system, show the headwater depth elevation for the one hundred (100) year flood elevation at the inlet entrance. Submit all drainage calculations for review and approval.

**Section ST 410**  
**Datum for Elevations**

Give datum reference used for elevations, and correlate to NGVD, mean sea level datum.

**Section ST 411**  
**Grading Permit**

A grading permit will be required if the project does not comply with Hamilton County Soil and Water Conservation District regulations per ST 3.00 Permits and Exemptions.

**Section ST 412**  
**Grading Plan**

Grading plans must comply with Hamilton County Soil and Water Conservation District regulations per ST 6.00 Plans & Specifications.

**Section ST 413**  
**Cut and Fill Slopes**

(a) Cut and fill slopes shall not result in a finished slope steeper than three (3) horizontal to one (1) vertical (3:1). If a request is made for a cut or fill slope steeper than 3:1, the applicant must obtain an opinion in writing from a qualified Geotechnical Engineer that the materials are capable of standing on steeper slope without creating a hazard. This opinion must be forwarded to the County Public Works Director for review and approval before the start of the cut and/or fill construction. Storm water detention construction including the control structure is to be installed at the grading stage of the development.

(b) If, in the opinion of the County Public Works Director, any cut slope exhibits the existence of inclined strata or fault, or any fill slope exhibits any of the conditions indicated under Section ST 806, he may require the Developer to furnish a report and recommendation from a qualified Geotechnical Engineer as to the probability of land sliding or other instability, and as to preventive measures required. If the Developer fails to follow such recommendations, the County Public Works Director shall declare the land affected to be unfit for human habitation, and shall so advise the Zoning Authority and Building Commissioner.

**Section ST 414**  
**Temporary Erosion and Sediment Control**

(a) A Temporary Erosion and Sediment Control Plan shall be included with the Improvement Plans for any new development that must be reviewed and approved by the County Public Works Director. The plan must show the delineation of the contributing drainage area to each temporary erosion and sediment control structure, along with the permanent items such as catch basins, culverts, storm sewers, drainage channels, etc. The plan shall also show the existing contours, proposed grading contours, and temporary grading contours on any scale that clearly shows the details.

(b) The temporary erosion and sediment control structures shall conform to the State of Ohio Standard Construction Drawing MC-11 (or DM-4.3 and DM 4.4M). Other erosion control schemes will be reviewed, when shown on the Temporary Erosion and Sediment Control Plan, and, if satisfactory, approved by the County Public Works Director.

(c) The Temporary Erosion and Sediment Control structures are to be placed at the strategic locations of all graded areas to prevent sediment and debris from being deposited on roadways, drainage courses, adjacent land and in any sewers. Special consideration must be given at low sag areas of roadways, at low point cul-de-sacs and at the outlet end of any existing or proposed storm sewer system. The Developer must notify the County Public Works Director and request approval of any change in the approved Temporary Erosion and Sediment Control Plan during the course of the construction. Sediment deposits from storm water flow within the development shall be controlled before the storm water is allowed to be discharged into any existing watercourse that flows through the development.

(d) Graded areas on slopes of 3:1 or steeper, shall be temporarily and/or permanently seeded, mulched, fertilized, watered and netted with any suitable plastic or other approved netting material before erosion occurs.

(e) The temporary erosion and sediment control structures shall comply with the following or "Best Management Practice": (See ODOT Location and Design Manual)

(1) For drainage areas less than one acre, straw bale ditch checks and, if inlets are included in the plans, bale inlet filters as per Standard Drawing MC-11 (or DM-4.3 and DM 4.4M) are required. Ditch checks should be spaced so that no check is within the backwater of a downstream check. A ditch check should be provided at all significant changes in ditch grades.

(2) For drainage areas between one (1) and five (5) acres, sediment basins as per State of Ohio Standard Construction Drawing MC-11 (or DM-4.3 and DM 4.4M) are required. Sediment basins shall provide a storage volume of 67 cubic yards per acre of contributing area, which is one-half inch ( $\frac{1}{2}$ " ) of runoff or an approximate two-year frequency. Should the failure of a sediment dam pose a significant danger to downstream property, the spillway should be checked to assure safe passage of a one hundred (100) year frequency storm. Specific size and location of sediment basins shall be shown on the plans.

(3) For drainage areas between five (5) and twenty (20) acres, sediment dams as per State of Ohio Standard Construction Drawing MC-11 (or DM-4.3 and DM 4.4M) shall generally be specified. However, for some conditions, a series of sediment basins may be more effective than a sediment dam. However, it may be necessary to acquire a temporary

easement to provide an adequate ditch control. The specific size and location of sediment basins and/or sediment dams shall be shown on the plans.

(4) When the drainage area exceeds twenty (20) acres and off-project drainage can not be diverted, the following method shall be specified. The watercourse carrying the off-project drainage may not be disturbed. Straw bale dikes, filters, ditch checks, sediment basins, and sediment dams in accordance with Standard Drawing MC-11 (or DM-4.3 and DM 4.4M) shall be placed in such a manner as to trap mud and debris from the disturbed project before it enters the watercourse that carries the off-project drainage. Where project drainage is not intercepted by a project ditch, a straw bale dike or other approved filter dike or fence shall be placed at the construction limits. The specific size and location of these controls shall be shown on the plans.

(f) All graded areas are to be maintained at all times to prevent erosion and excessive runoff. The County Public Works Director reserves the right to require additional measures to prevent erosion and excessive runoff if the Developer or Builder has not accomplished same.

#### **Section ST 415**

##### **Pipes, Culverts, Sewers, and Drains.**

All fills intended to support a drainage structure and sewer shall comply with ODOT 203.02 and 603.11. The work shall be performed under the supervision of a qualified soils engineer. The Soils Engineer registered in the State of Ohio shall furnish a certificate in duplicate to the County Public Works Director, certifying to the location and degree of compaction of such fills.

#### **Section ST 416**

##### **Mud and Debris**

Until subdivision improvements in the development have been completed, the Developer and/or Builder, whichever is responsible shall take such measures as are necessary to prevent erosion of graded surfaces onto roadways, into drainage courses, or sewers, or onto adjoining land. Refer to Temporary Erosion and Sediment Control, Section ST 414, for additional information. For any grading project or any development approved by the County Public Works Director, the Developer and/or Builder, whoever is responsible, shall clean up any mud and debris deposited on roadways, drainage courses, or adjoining property when the mud and debris originates from the graded surfaces.

#### **Section ST 417**

##### **Restriction on Filling in Flood Plain Areas within the Special Flood Hazard Areas**

The rules and regulations as indicated in Section ST 311 thru 313 and ST 419 apply in all cases.

**Section ST 418****Flood Damage Prevention Regulations (F.D.P.R.)**

Improvement plan development shall be in conformance with the F.D.P.R. (EXHIBIT No. 35) Rules and Regulations.

**Section ST 419****"As-Built" Floor Elevations within Flood Hazard Areas**

Following construction of all buildings within a Special Flood Hazard Area, and prior to the issuance of a Certificate of Occupancy, field verification (by a Surveyor registered in the State of Ohio) of the lowest floor elevation must be made and supplied to the Department of Public Works. See EXHIBIT No. 36.