

ARTICLE V – IMPROVEMENT AND CONSTRUCTION REQUIREMENTS

501 – MONUMENTS AND MARKERS

Monuments and markers shall be placed so that the scored or marked point coincides exactly with the point of intersection of the lines being monumented. They shall be set so that the top of the monument or marker is level with the finished grade of the surrounding ground. Monuments shall be marked on top with a copper or brass plate or dowel set in the concrete.

501-A – MONUMENTS

1. Monuments shall be set:
 - a. At the intersections of all right-of-way lines.
 - b. At the intersection of lines forming angles in the boundaries of the development.
 - c. At such intermediate points as may be required by the engineer.
2. Monuments shall be six (6) inches square or four (4) inches in diameter, thirty inches long and made of concrete, stone, or by setting a four (4) inch cast iron or steel pipe filled with concrete.

501-B – MARKERS

1. Markers shall be set:
 - a. At all lot corners except those monumented.
 - b. Prior to the time the lot is offered for sale.
2. Markers shall be three-quarters (3/4) of an inch square or three-quarters (3/4) of an inch in diameter, fifteen (15) inches long. Markers shall be made of iron pipes or iron or steel bars.

502 - STREETS

Streets shall be surfaced to the grades and dimensions drawn on the plans, profiles, and cross-sections submitted by the Subdivider and approved by the Township. Before paving the street surface, the subdivider shall install the required utilities and provide, where necessary, adequate storm water drainage for the streets, as acceptable to the Township. Following a review of the subdivision plan and consultation with the subdivider and the governing body of the municipality in which the subdivision is located, the Township shall determine the type of development and the specifications for the base and wearing surface of the streets in accordance with the following:

502-A – URBAN OR SUBURBAN DEVELOPMENTS

1. Minor Streets:
 - a. Except when otherwise specified by the Township, the subbase course shall consist of five (5) inches of PADOT #3 modified aggregate covered by three (3) inches of PADOT #2A aggregate, except in non-stable areas which are to be stabilized with #4 ballast prior to construction of the subbase. PennDOT Specifications of 1983, as amended must be followed. (Amended 11/10/2003)
 - b. Construction of the surface course shall comply with the specifications as set forth in Sec. 400, Bituminous Binder and Wearing Course of PennDOT Specifications 1982, as amended. The binder course will be four (4) inches and the wearing course will be one and on-half (1½”) inches. (Amended 12/12/2001)
2. Collector Streets:
 - a. Except when otherwise specified by the Township, the subbase course shall consist of five (5) inches of PADOT #3 modified aggregate covered by three (3) inches of PADOT #2A aggregate, except in non-stable areas which are to be stabilized with #4 ballast prior to construction of the subbase. PennDOT Specifications of 1983, as amended must be followed. (Amended 11/10/2003)
 - b. Construction of the surface course shall comply with the specifications as set forth in Sec. 400, Bituminous Binder and Wearing Course of PennDOT Specifications 1982, as amended. The binder course will be four (4) inches and the wearing course will be one and on-half (1½”) inches. (Amended 12/12/2001)
3. Arterial streets: For the construction of arterial streets, the developer shall consult with the Township and be governed by the Pennsylvania Department of Transportation specifications for the method of construction to be used. The Township shall decide if a collector or arterial street is required as a direct result of the construction of the development, in which case the developer shall be responsible for the costs of such street there of in accordance with law. (Amended 2-2000)

502-B – PRIVATE STREETS

1. All private streets shall be constructed in accordance with Section 502, or bonded in accordance with Section 518 of this Ordinance prior to approval of the Final Plan.
2. Whenever a subdivider proposes to establish a street which is not offered for dedication to public use, the Township shall require the subdivider to submit, and also to record with the Plan, a copy of an agreement made with the Township on behalf of his heirs and assigns, and signed by the Township Solicitor, and which

shall establish the conditions under which the street may later be offered for dedication, and shall stipulate among other things:

- a. That the street shall conform to the Township specifications or that the owner of the abutting lots shall include with the offer of dedication sufficient money, as estimated by the Township Engineer, to restore the street to conformance with the Township specifications.
- b. That an offer to dedicate the street shall be made only for the street as a whole.
- c. That the method of assessing repair costs be as stipulated.
- d. That agreement by the owners of more than fifty percent (50%) of the front footage thereon shall be binding on the owners of the remaining lots.

502-C – STREET LIGHTS

In any proposed subdivision or land development involving ten (10) or more lots or dwelling units with an average lot size or area per dwelling unit of fifteen thousand (15,000) square feet or less, a street light meeting Township requirements shall be installed at one (1) corner of every intersection. In lieu of street lights, the Township may require the developer to install individual property lights in the ratio of one (1) to each lot.

502-D- STREET SIGNS

Street name signs shall be placed at one (1) corner of every intersection. The design must be according to the Township requirements.

502-E- STREET TREES

Street trees shall be provided in the development as required in Section 520 Landscaping.

503 – CURBS AND GUTTERS

1. Curbs shall be installed at the decision of the Supervisors on both sides of any proposed street included in a proposed subdivision. Curbs may also be required on existing streets where curbs are necessary to control the flow of surface water and regulate traffic.
2. Curbs may be required in all parking compounds located within multi-family development projects.
3. All curbs shall be constructed of Portland Cement Concrete. The construction of vertical curbs shall conform to the requirements of Section 630, Plain Cement Concrete Curb, Type A., of the Pennsylvania Department of Transportation specifications 1983 or as amended. Rolled curb and gutter type curbs may be constructed using a curbing machine.

4. Curb cut ramps shall be provided for the physically handicapped as required by Section 228 of the 1973 Highway Safety Act, Commonwealth of Pennsylvania.

504 – SIDEWALKS

In any proposed subdivision or land development with an average lot size or area per dwelling unit of fifteen thousand (15,000) square feet or less, or where any subdivision is immediately adjacent to or within one thousand (1000) feet of, any existing or recorded subdivision having sidewalks, sidewalks shall be installed on each side of the street in accordance with Township requirements. The Township may also require installation of sidewalks in any subdivision of land development where the evidence indicates that sidewalks are necessary for the public safety.

1. Sidewalks shall be within the right-of-way of the street and shall extend to width from the right-of-way line toward the curb line.
2. Sidewalks shall be at least four (4) feet wide. In the vicinity of shopping centers, schools, recreation areas and other such facilities, sidewalks shall be at least five (5) feet wide and located within the street right-of-way.
3. All sidewalks shall be constructed of Type 1 of Class A concrete.
4. Sidewalks shall be of a uniform depth of four (4) inches, except where crossed by driveways, where the depth shall be six (6) inches for residential driveways, and eight (8) inches for commercial driveways. The width of the sidewalk shall be the width specified in the ordinance.
5. Construction joints shall be spaced no more than five (5) feet apart.
6. The forms used shall be of metal. All forms shall be smooth, straight, free from warp.

505 – SEWER AND WATER SUPPLY SYSTEMS

All sanitary sewer and water supply systems located in any designated floodplain district shall be floodproofed up to the regulatory flood elevation.

505-A – PRIVATE AND ON-SITE SEWER SYSTEMS

1. All properties shall be connected to a public sanitary sewer system if possible.
2. Where a public sanitary sewer system is not accessible, but is proposed for extension within five (5) years to the development or to within one thousand (1000) feet of the development, the developer shall install sewer lines, including lateral connections, to provide adequate service to each lot when connection with the public system is made. The sewer lines shall be capped at the street right-of-way line. When capped sewers are provided, on-site disposal facilities shall also be provided. If the available engineering and design information for the proposed public system is insufficient to insure the proper installation of capped sewer lines, the developer shall, at the Township's discretion, provide for the eventual

installation by creating an escrow account in an amount sufficient to provide for the eventual construction of said sewer lines.

3. If no public system is either proposed within five (5) years or within one thousand (1000) feet of the development, the Township Supervisors may require that a study be prepared to determine the feasibility of constructing a private sewer system or treatment facility, or connecting to any existing private or public system over one thousand (1000) feet away.
4. Upon completion of any sanitary sewer system installation, the plan for the system as built shall be filed with the Township.
5. Where none of the above alternatives are possible or feasible, an individual sewage disposal system consisting of a septic tank and tile absorption field or other approved sewage disposal system shall be provided for each lot at the time improvements are erected or installed thereon. All such individual sewage disposal systems shall be constructed in accordance with the Pennsylvania Department of Environmental Resources or Germany Township's regulations.

505-B – PRIVATE AND ON SITE WATER SYSTEMS

1. Where a water main supply system is within one thousand (1000) feet of, or where plans approved by the Township provide for the installation of such public water facilities, the developer shall provide the development with a complete water main supply system to be connected to the existing or proposed water main supply system in accordance with the Township's requirements. If the available engineering and design information for the proposed public system is insufficient to insure the proper installation of such water main supply system, the developer shall, at the Township's discretion, provide for the eventual installation by creating an escrow account in an amount sufficient to provide for the eventual construction of the system.
2. If connection to a public water supply system is not possible, a report on the feasibility of constructing a separate water supply system may be required by the Township and a report shall be submitted setting forth the findings.
3. The plans for installation of a private water supply system shall be prepared by the land developer, and approved by the Pennsylvania Department of Environmental Resources. Upon completion of any water supply system, the plan for the system as built shall be filed with the Township.
4. Where none of the above alternatives are possible or feasible, an individual water supply system shall be installed.
 - a. The water supply yield shall be adequate for the type of development proposed.
 - b. The installation of such systems shall not endanger or decrease groundwater supplies of adjacent properties.

- c. Any such individual system shall meet any applicable Pennsylvania Department of Environmental Resources regulations and/or German Township Regulations.

505-C – ASSOCIATION OR OTHER ORGANIZATIONS FOR OPERATING AND MAINTAINING OF THE PRIVATE SYSTEMS

1. When private sewage treatment systems and/or water supply systems are installed by the developer an association or other organization must be established by the developer to operate and maintain the systems.
2. Any and all legal documents involving in establishing this association or other organization must be submitted and approved by German Township prior to approval of the final plan.

506 – FIRE HYDRANTS

Fire hydrants shall be provided as an integral part of any public water supply system.

1. Fire hydrants shall be installed if their water supply source is capable of serving them in accordance with the requirements of the local fire authority.
2. Fire hydrants shall be in accordance with specifications set forth by the National Fire Protection Association or as amended.
3. Fire hydrants shall be placed at intervals of not more than six hundred (600) feet or as specified by the Middle Department Association of Fire Underwriters.

507 – STORMWATER DRAINAGE AND STORMWATER MANAGEMENT (Section 507 amended 2-2000)

507-A - GENERAL

1. A stormwater management plan shall be submitted for all subdivisions and/or land developments unless deemed not necessary by the Township. The plan shall show all drainage within the area affecting the subject property, all existing and proposed drainage facilities and all grading proposed for the subject property, as well as the additional plan information required in this section.
2. All land areas shall be graded to secure proper drainage away from buildings, on lot sewage disposal facilities, and the like, and to prevent the collection of stormwater in pools. Drainage provisions shall be of such design as to carry surface waters to the nearest practical natural drainage channel, storm sewer system detention basin or other drainage facilities. The landowner or developer shall construct and/or install such drainage structures and/or pipes as are determined necessary by the Township to prevent soil erosion, damage and siltation and to satisfactorily carry off surface water. In the design of storm drainage facilities, special consideration must be given to preventing excess runoff onto adjacent developed or undeveloped properties. In no case may any slope exceed the normal angle of slippage of the material involved. All slopes must be

protected against erosion. In no case may a change be made in the existing topography which would:

- a. Result in a slope of more than ten (10%) percent within twenty (20) feet of a property line; and
 - b. Alter the existing drainage or topography in a way so as to adversely affect adjoining properties.
3. Storm sewers, culverts, bridges and related drainage installations shall be provided to:
- a. Permit unimpeded flow of natural watercourses. Such flow may be redirected as required, subject to the approval of the Pennsylvania Department of Environmental Protection.
 - b. Ensure adequate drainage of all low points as may be related to streets.
 - c. Intercept stormwater runoff along streets at intervals reasonably related to the extent and grade of the area drained to prevent flow of stormwater across intersections and to prevent the flooding of intersections during the design storm.
 - d. Ensure adequate and unimpeded flow of stormwater under driveways in, near or across natural watercourses or drainage swales. Properly sized pipes or other conduits shall be provided as necessary.
 - e. Prevent excessive flow on or across streets, sidewalks, drives, parking areas and any other paved surface or accessway.
 - f. Direct stormwater away from springs.
 - g. Provide adequate drainage away from on-site sewage disposal systems.
4. The stormwater management plan for each subdivision and/or land development shall take into account and provide for upstream areas within the entire watershed in computing discharge quantities, sizing of pipes, inlets and other structures. The runoff from any proposed development shall be subject to evaluation which includes the anticipated runoff from other existing or proposed developments within the same watershed. Stormwater management facilities designed to serve more than one property or development in the same watershed are encouraged, in which case consultation with the Township is required prior to design.
5. All natural streams, channels, swales, drainage systems, and/or areas of concentration of surface water shall be maintained in their existing condition unless alteration is approved by the Township. In any event, all encroachment activities shall comply with the Pennsylvania Department of Environmental Protection Dam Safety and Waterway Management Rules and Regulations.

6. Man-made structures shall be kept to a minimum and bridges, culverts or rip-rap shall be constructed to maintain the natural characteristics of the stream and shall meet the approval of the Township.
7. For the purpose of this subsection, streams and intermittent streams are defined as those watercourses on the USGS Quadrangle Maps of the area, and/or as determined as such pursuant to an on-site survey by the Township.
8. Retention/detention basins shall be designed to utilize the natural contours of the land. When such design is impracticable, the construction of the basin shall utilize slopes as shallow as possible to blend the structures into the existing terrain.
9. Any subdivision and/or land development within a flood hazard district shall comply with all of the provisions of the Germany Township Building Permit Ordinance, and the rules and regulations of the Pennsylvania Department of Environmental Protection.
10. The Township may require that a landowner or developer provide reasonable corrective measures to alleviate an existing off-site drainage problem which may be affected by the proposed subdivision and/or land development. It shall be the responsibility of the landowner or developer to obtain all drainage easements in, over, or through other properties, and the Township, its agents, workmen, servants and employees shall be indemnified and held harmless from any liability.
11. Any water originating from nonnatural sources such as swimming pools, air-conditioning units, sump pumps, roof drains or other similar flow shall be properly discharged into natural watercourses on the property or connected to an existing or proposed storm drainage system as approved by the Township. Polluting matter from such sources may not be deposited into natural watercourses or storm drains.
12. Any water originating from nonnatural sources as referenced above shall not be discharged onto any street or other public right-of-way used for pedestrian or vehicular access.
13. All lots, tracts or parcels shall be graded to provide proper drainage away from buildings and dispose of the runoff without ponding, and all land within a development shall be graded to drain and dispose of surface water without ponding, except where other arrangements are approved by the Township. Grading shall not be done in such a way to divert water onto the property of another landowner without the expressed consent of the Township and the affected landowner.
14. In addition to any other requirement of this chapter, the landowner or developer may be required to participate in correcting improvements in the drainage basin within which the proposed development is located. The specified off-site drainage improvements required shall be those specified by the Township to mitigate off-site impacts created by the proposed development.

507-B - STORMWATER MANAGEMENT PLAN

1. General requirements. If required, the stormwater management plan and report shall be submitted containing but not limited to the information below. The determination of the need for additional information shall be made by the Township after conducting a review of the following:
 - a. A map depicting the total watershed. A USGS Quadrangle Map is suitable as the source for such a map. However, the watershed area must be highlighted or otherwise distinguished from other areas outside the watershed.
 - b. Maps and drawings showing all existing and proposed drainage facilities affecting the subject property.
 - c. A plan of the site, at a scale of no less than one (1) inch equals fifty (50) feet, prepared by a registered engineer or surveyor and including the following:
 - (1) All existing topographic features with a contour interval of at least two (2) feet.
 - (2) Boundary survey information.
 - (3) Location and description of all vegetative and land cover characteristics.
 - (4) All existing utilities.
 - (5) Soil types.
 - (6) All existing natural or man-made features.
 - (7) All proposed improvements, including but not limited to proposed buildings, driveways, stormwater drainage systems, sewage disposal systems, wells, stormwater management facilities, grading, soil erosion and sedimentation control and procedures and the like.
 - (8) Profiles of all proposed sewers, including elevations, sizes, slopes and materials, at a scale of no less than one (1) inch equals fifty (50) feet horizontal and one (1) inch equals five (5) feet vertical.
 - (9) Staging of earthmoving activities and program of operation.
 - (10) Locations, dimensions and design details required for the construction of all facilities.
 - (11) All soil erosion and sedimentation control measures, temporary as well as permanent, in sufficient detail in order to clearly indicate effectiveness of the plan. The Adams County Conservation District must approve this plan.

- (12) Project specifications relative to stormwater control.
 - (13) When major control facilities, such as detention/retention basins, are planned, soil structures and characteristics shall be investigated and analyzed. Plans and data shall be prepared and submitted by a licensed professional engineer or geologist with experience and education in soil mechanics. These submissions should consider and offer design solutions for frost heave potential, shrink-swell potential, soil settling characteristics, suitability of existing soils for placement of fill and backfilling procedures and soil treatment techniques as required to protect the improvements or structures.
- d. The design computations for the stormwater drainage systems, including storm drain pipes and inlets, runoff control measures, and culverts and drainage channels.
 - e. A narrative report of the project stating the proposed engineering assumptions and calculations for control measures and facilities. The following information shall be included:
 - (1) General description of the project.
 - (2) General description of accelerated runoff control plan.
 - (3) General description of soil erosion and sedimentation control plan.
 - (4) Expected project time schedule, including anticipated start and completion dates.
 - (5) The stormwater characteristics of the project as related to its location within the watershed(s).
 - (6) On-site detention methods.
 - (7) Methodology and basis of design computations.
 - (8) Brief description of soils and their characteristics.
 - (9) The stormwater management plan shall comply with all other applicable sections of this chapter and any other Township Ordinance.

507-C - STORMWATER DRAINAGE PLAN

- 1. A plan showing all predevelopment and postdevelopment stormwater flow to and from basins. A plan showing all postdevelopment flows to all inlets, headwalls, swales, channels and the like. The drainage areas and the design flow to each inlet or structure shall be delineated on a copy of the stormwater management plan where applicable.
- 2. The following stormwater related items shall be included as part of the plan submission:

- a. Preliminary plan contents:
 - (1) The watershed and subarea in which the site is located as well as the corresponding release rate percentage, where applicable.
 - (2) Existing ground cover conditions.
 - (3) Definition of the existing drainage paths and drainage area boundaries.
 - (4) Definition of existing on or off-site drainage problems.
 - (5) Appropriate stormwater management criteria such as release rate percentage, direct discharge and downstream impact elevation.
 - (6) Layout of existing and proposed streets, buildings, approximate building dimensions, parking areas, walkways and other impervious areas.
 - (7) Configuration of the storm sewer and sanitary sewer system layouts.
 - (8) Approximate location and layout of the stormwater management system with a description of its proposed design and operation.
 - (9) Existing and proposed drainage easements.
 - (10) Preliminary runoff calculations as set forth in the stormwater management plan.
 - (11) Ownership and maintenance provisions for all stormwater related facilities.
- b. Final plan contents:
 - (1) Data requirements as set forth for the preliminary plan.
 - (2) Final layout of existing and proposed streets and buildings, actual building dimensions, parking areas and other impervious areas.
 - (3) Exact location and layout of the stormwater management system with a detailed description of its proposed design and operation.
 - (4) Detailed surface water runoff calculations as set forth in this section.

507-D - STANDARDS AND CRITERIA

1. Storm drainage system.

a. Design flow rate.

- (1) The storm sewer system shall be designed to carry a ten (10) year peak flow rate, with a twenty-five (25) year peak flow rate at all low

points. The peak flow rate into each inlet shall be indicated on the stormwater drainage plan. The design flow rate shall be determined by the rational formula, $Q=CIA$.

Where:

Q =Peak runoff rate, cubic feet per second (CFS)

C = Runoff coefficient equal to the ratio of the peak runoff rate to the average rate of rainfall over a time period equal to the time of concentration.

I = Average rainfall intensity in inches per hour for a time equal to the time of concentration.

A =Drainage area in acres.

- (2) Appropriate values for the runoff coefficient and rainfall intensity shall be taken from the following source:

Commonwealth of Pennsylvania
Department of Transportation
Design Manual, Part 2
Highway Design
January 1990 Edition or the latest revision

2. Storm sewer system design.

- a. The storm sewer system shall be designed to the more restrictive of the following: to collect stormwater at any point where three (3) to five (5) cubic feet per second is accumulated during the design storm; and/or inlets/manholes shall not be spaced more than three hundred (300) feet apart on pipe sizes up to twenty-four (24) inches in diameter and not more than four hundred (400) feet apart on greater sizes.
- b. Inlets, manholes, grates, covers, frames, and the like shall conform to the Pennsylvania Department of Transportation Roadway Construction Standards and Form No. 408 specifications and all amendments, revisions or updates thereto.
- (1) All inlets and manholes shall be precast concrete, unless approved otherwise by the Township.
- (2) Catch basins or sump areas below inlet piping shall not be permitted.

3. Bridge/culvert/channel design.

- a. Bridges and culverts shall have ample waterway to carry expected flows, based on a minimum storm frequency of twenty-five (25) years or as required by the Pennsylvania Department of Environmental Protection (PADEP). Bridge and/or culvert design shall be in accordance with the

Pennsylvania Department of Transportation and/or the Pennsylvania Department of Environmental Protection requirements. All culverts shall be provided with concrete end walls.

- b. All drainage channels shall be designed to carry a flow rate equal to a one-hundred (100) year, twenty-four (24) hour storm.
 - c. All drainage channels shall be designed to prevent the erosion of the stream bed and stream bank areas. The flow velocity in all vegetated drainage channels shall not exceed the maximum permissible velocity to prevent soil erosion. Suitable bank stabilization shall be provided where required to prevent soil erosion of the drainage channels. Where storm sewers discharge into existing drainage channels at an angle greater than thirty degrees (30°) from parallel with the downstream channel flow, the far side bank shall be stabilized by the use of rip-rap and masonry and/or concrete walls. The stabilization shall be designed to prevent soil erosion and frost heave under and behind the stabilizing media.
 - d. Any vegetated drainage channel requiring mowing of the vegetation shall have a maximum slope of four (4) horizontal to one (1) vertical on those areas to be mowed.
 - e. The design of all channels shall, as a minimum, conform to the design procedures outlined in:
 - (1) The United States Department of Transportation Federal Highway Administration Roadside Drainage Channels Hydraulic Design Series No. 4. as amended or revised.
 - (2) The United States Department of Transportation Federal Highway Association Design Charts for Open Channel Flow Hydraulic Design Series No. 3. as amended or revised.
 - (3) Standards and Specification for Soil Erosion and Sediment Control in Developing Areas, United States Department of Agriculture, Soil Conservation Service, College Park, Maryland.
4. Overflow system. An overflow system shall be provided to carry flow to the detention basin when the capacity of the storm drain pipe system is exceeded. The overflow system shall have sufficient capacity to carry the difference between the one-hundred (100) year and the ten (10) year peak flow rates.
 5. Inlet capacity.
 - a. All inlets must be designed to accommodate the ten (10) year peak flow rate, except at low points where they shall accommodate the twenty-five (25) year peak flow rate. The capacity of Type C, M or S inlets shall be determined from the following source:

Commonwealth of Pennsylvania
Department of Transportation

Design Manual, Part 2
Highway Design
January 1990 Edition or the latest revision

- b. The capacity of each inlet shall be indicated on the stormwater drainage plan. All stormwater management plans shall indicate that inlet grates be installed in such a manner that the roadway stormwater will be directed into the inlet and away from the roadway. All inlets shall be designed to create a one (1) inch sump condition below finished road surface unless approved otherwise by the Township. At curbed street/driveway intersections, inlets shall be placed on the tangent section and not in the curved portion of the curbing.
6. Straight pipe sections. All storm sewers shall be designed to follow straight courses. No angular deflections of storm sewer pipe sections in excess of five (5°) degrees shall be permitted. No vertical curves shall be permitted in the storm sewer system.
7. Minimum grade and size. All storm sewer pipes shall be designed to maintain a minimum grade that will result in a full flow velocity of at least two (2) feet per second. All storm sewer pipes shall have a minimum inside diameter of fifteen (15) inches.
8. Pipe capacity. The capacity of all pipe culverts shall, as a minimum, provide the required carrying capacity as determined by the following sources:
 - a. The United States Department of Transportation
Federal Highway Administration
Hydraulic Engineering Circular No. 5, as amended or revised.
Hydraulic Charts for the Selection of Highway Culverts
 - b. The United States Department of Transportation
Federal Highway Administration
Hydraulic Design Series No. 3, as amended or revised.
Design Charts for Open Channel Flow
 - c. The United States Department of Transportation
Bureau of Public Roads
Hydraulic Engineering Circular No. 10
Capacity Charts for the Hydraulic Design of Highway Culverts
9. Pipe arches. Where headroom is restricted, equivalent pipe arches may be used in lieu of circular pipes.
10. Pipe material and gauge thickness. All storm sewers shall be either reinforced cement concrete, corrugated aluminum, corrugated galvanized steel pipe or corrugated polyethylene pipe. Storm sewers shall be of the proper class and thickness to support the above fill material. Pipe class and gauge or thickness shall be noted on the plans. All pipe shall conform to Pennsylvania Department of Transportation specifications.

11. Allowable headwater depth. At all inlets or manholes, the maximum allowable headwater depth shall be one foot (1) below the top of the inlet grate or the manhole.
12. Horizontal pipe deflections. A manhole or inlet shall be provided at all horizontal deflections in the storm pipe system exceeding five degrees (5°).
13. Minimum and maximum cover. In lawn areas, a minimum of eighteen (18) inches of cover shall be maintained over all storm drain pipes. Under streets, the top of storm drain pipes shall be a minimum of six (6) inches below subgrade elevation. The maximum cover over storm drainpipes shall be ten (10) feet unless otherwise approved by the Township.
14. Storm sewer system outlets. Storm sewer system outlet pipes shall extend to proposed stormwater management facilities, natural watercourses and the like. A concrete end wall shall be required on all storm sewer system inlet and outlet pipes. All storm/sewer outlets twenty-four (24) inches in diameter or greater shall be equipped with a galvanized child-proof horizontal bar rack, bolted to the end wall.
15. Roof drains. Stormwater roof drains shall not discharge water directly over a sidewalk, into any sanitary sewer line, or into a street or paved area without a straight curbed gutter.
16. Drainage easements:
 - a. All storm sewer easements through undedicated land shall be a minimum of twenty (20) feet in width.
 - b. Where a site is traversed by a watercourse, a drainage easement or right-of-way conforming substantially with the line of such watercourse and of such width as will be adequate to preserve natural drainage and provide sufficient width for maintenance shall be created, as determined by the Township.
 - c. Diversion of surface water runoff. All storm sewers and/or drainage swales shall be designed to carry such runoff into a detention basin or similar facility utilized to control the rate of runoff, unless approved otherwise by the Township.
17. Runoff control measures.
 - a. Runoff control. The rate and quantity of stormwater runoff from any proposed subdivision and/or land development shall not exceed the rate and quantity of runoff prior to development (i.e., zero increase runoff). This standard shall be maintained for all storms (i.e., both high-frequency and low-frequency).
 - b. Runoff control devices. The increased runoff which may result from subdivisions and/or land developments shall be controlled by permanent runoff control measures that will provide the required runoff control specified above. All runoff control devices will be evaluated for their effectiveness to

maintain the above mentioned standard for all storms with a return period of up to one hundred (100) years.

- c. Groundwater recharge. All runoff control measures will be designed to encourage groundwater recharge when suitable subsurface conditions are present. Soils testing and certification by a registered professional engineer, geologist, soils scientist or the like shall be required when groundwater recharge systems are proposed.
- d. Detention basin versus other available methods. Detention basins are an acceptable technique for controlling the rate of runoff from a subdivision and/or land development. However, the use of other available runoff control measures can be employed as approved by the Township. Runoff control measures other than detention basins may include on-lot berms, on-lot or centralized seepage beds. All pertinent detention basin design standards shall be applicable to any such on-lot facilities.
- e. Regional detention basins. The use of regional detention basins to combine and eliminate numerous smaller basins is encouraged. Consultation with the Township is required prior to design of a regional detention basin.

507-E - DETENTION/RETENTION BASINS

- 1. Detention basins shall be designed in accordance with the Soil Cover Complex Method and the procedures developed by the United States Department of Agriculture, Soil Conservation Service, as outlined in their Technical Release No. 55, Urban Hydrology for Small Watersheds, with specific attention given to antecedent moisture conditions, flood routing and peak discharge and Hydrology National Engineering Handbook Section 4.
- 2. Basin design criteria (SCS).
 - a. Basins shall be designed to safely convey the quantity of water resulting from a one-hundred (100) year, twenty-four (24) hour storm (6.7 inches of rainfall) under full development conditions. Stormwater management calculations shall ensure that the predevelopment discharge from the site is as follows:
 - (1) The release rate from storms up to ten (10) years in recurrence frequency shall be limited to the predevelopment flow rate from a two (2) year storm.
 - (2) The release rate from storms up to one hundred (100) years in recurrence frequency shall be limited to the predevelopment flow rate from a ten (10) year storm.
 - (3) Retention facilities shall be designed to retain the differences in flow rates per above.
 - (4) The emergency spillways from such facilities shall be designed based on a one-hundred (100) year storm. The time of concentration method

shall be utilized in the development of the runoff hydrography and peak discharges. Storage-discharge curves shall be provided for all basins

- b. The following criteria shall apply in the calculation of stormwater runoff values:
 - (1) Meadow conditions shall be used as the basis for establishing the predevelopment runoff values for all areas other than woodland, including areas which are presently covered by impervious surfaces, except as stated below.
 - (2) In the case of an expansion of an existing development, allow the exclusion of only existing impervious areas from the requirements of Section 507-E.2.b(1) above, provided that the existing development does not presently contribute to an existing drainage problem downstream upon the approval of the Township.
 - (3) A Type II distribution storm.
3. Outlet control structures.
 - a. All outlet control structures shall be constructed of concrete, properly anchored to prevent flotation and equipped with child-proof, nonclogging removable trash racks over all design openings twelve (12) inches or greater in diameter, except those openings designed to carry perennial stream flows.
 - b. Temporary sedimentation controls shall be provided during construction to prevent the flow of sediment through the basin outlet pipe. Such measures may include temporary riser pipes, rock-filled gabions, plywood standboxes, silt fences and the like.
4. Emergency spillways. Whenever possible, the emergency spillway for basins shall be constructed on undisturbed ground. Emergency spillways shall be constructed of reinforced concrete, concrete moundslabs or vegetated earth. All emergency spillways shall be constructed so that the basin berm is protected against soil erosion. The minimum capacity of the emergency spillway shall be designed to pass the one-hundred (100) year postdevelopment flow. Emergency spillways shall extend along the upstream and downstream berm embankment slopes. The emergency spillway shall not discharge stormwater over earthen fill and/or easily erodible material without adequate protection against soil erosion.
5. Freeboard. The minimum freeboard shall be one (1) foot. (Freeboard is the difference between the design flow elevations in the emergency spillway and the top of the settled basin embankment.)
6. Basin outlet pipes. Basin outlet pipes shall be equipped with watertight joints.
7. Antiseep collars. Antiseep collars shall be installed around the principal pipe barrel within the normal saturation zone of the basin berms. The antiseep collars and their connections to the pipe barrel shall be watertight. The antiseep collars shall

be designed in accordance with USDA SCS criteria. Design calculations for antiseep collars must be submitted with the basin calculations.

8. Basin outlets. Energy dissipating devices (concrete aprons and the like) shall be placed at all basin outlets. Concrete end walls shall be placed at all basin outlets. All basin outlet pipes twelve (12) inches in diameter or greater shall be equipped with child-proof devices to deter entry by pedestrians or animals. Design calculations for proposed energy dissipaters must be submitted with basin calculations.
9. If the flow from a detention facility would otherwise damage or interfere with the agricultural or residential use of a property over which it would flow, it shall be piped to a stream; provided, however, this provision shall not apply if the owner of the property which would be adversely affected by the flow refuses to grant the subdivider or land developer a right-of-way to pipe the flow from the detention facility underground at a sufficient depth so as not to interfere with agricultural use without damage to growing crops and trees and provided further the pipeline shall be located so as to minimize such surface damage.
10. Slope of detention basin embankment.
 - a. The maximum slope of earthen basin embankments shall be four (4) to one (1). The top or toe of any slope shall be located a minimum of fifteen (15) feet from adjacent property lines with the exception of the downstream property line where the toe of the embankment shall be placed a sufficient distance to allow for energy dissipating devices but in no case less than forty (40) feet unless approved otherwise by the Township.
 - b. Whenever possible, the side slopes and basin shape shall blend with the natural topography. Straight side slopes and rectangular basins shall be avoided whenever possible.
11. Width of berm. The minimum top width of detention basin berms shall be six (6) feet.
12. Construction specifications. The plans shall indicate the construction specifications and compaction requirements for all detention/retention basins.
13. Slope of basin bottom. In order to ensure proper drainage of detention basins, a minimum grade of one (1%) percent shall be maintained for all basins.
14. Cut-off trench. A cut-off trench shall be excavated along the center line of dam on earth fill embankments. The minimum depth shall be three (3) feet. The minimum bottom width shall be ten (10) feet or wide enough to permit operation of compaction equipment. The side slopes shall be no steeper than 1:1. The trench shall be kept free from standing water during the backfilling operations.
15. Grading and landscaping of basins, cuts and fills. No excavation or fill shall be made with a cut and fill slope steeper than four (4) feet horizontal to one (1) foot vertical. A written statement shall be required from a civil engineer licensed by the Commonwealth of Pennsylvania having experience in soils engineering certifying

that the site has been inspected and that any proposed deviation from the slope specified above should not endanger any property or result in personal injury. Retaining walls will be required if a stable slope cannot be maintained. Any retaining wall design must be designed by an experienced structural engineer licensed by the Commonwealth of Pennsylvania. The toe of any cut or fill slope must be located a minimum of fifteen (15) feet from adjacent property lines with the exception stated in Section 507-E.10a above.

16. Landscaping.

- a. A minimum of four (4) inches of topsoil shall be placed on all areas affected by the basin construction (bottom of basin, side slopes, top of berm and the like).
- b. All earthen basins shall have standard seed mix with temporary and permanent grasses or other approved ground covers within seven (7) days after final grading.
- c. Fencing may be required around detention/retention basins where the Township determines that circumstances warrant the fencing.
- d. All detention/retention basins shall be landscaped.

17. Permanent pond.

- a. A five (5) foot wide bench sloping at four (4%) percent shall be provided for all detention/retention basins designed to contain a permanent pond of water.
- b. When a permanent pond is proposed, a report of a certified geotechnical specialist must be provided certifying that the water will not become stagnant. The basin side slopes below the water line must not exceed 4:1.

18. Positive drainage. Detention basins, not intended as permanent facilities, must be designed to eliminate standing water or swampy conditions after the basin has drained. This must be accomplished either by the installation of stone-trenched underdrains or by providing a minimum basin bottom slope of one (1%) percent to the basin outlet. Other arrangements may be presented for review and approval by the Township. Whatever design is used, the facility must be entirely dewatered at the completion of its usefulness.

507-F- APPROVALS FROM REGULATING AGENCIES

1. All requirements of the Pennsylvania Department of Transportation, Pennsylvania Department of Environmental Protection and/or the USDA Soil Conservation Service, with regard to storm drainage and stormwater management, shall be followed, and evidence of approvals by those agencies shall be submitted to the Township if required.

507-G - INSPECTIONS

1. All earthwork and material shall be subject to inspection for conformity with the terms of this section.
2. During inspections, if it is found that the soil or other conditions are not as stated or shown in the application and approved plans, the Township may refuse to approve further work and revoke any or all permits and/or agreements until approval is obtained for a revised soil erosion and sedimentation control plan conforming to existing conditions.
3. If, at any stage of the work, the Township shall determine by inspection that the nature of the work is such that further work as authorized by an existing permit is likely to endanger property or streets or create hazardous conditions, the Township may require as a condition to allowing the work to be done that such reasonable safety precautions be taken as the Township considers advisable to avoid such likelihood of danger.
4. No person shall interfere with or obstruct the ingress or egress to or from any such site or premises by an authorized representative or agent of the Township of Germany engaged in the inspection of work for compliance with the approved plans.

507-H - MAINTENANCE AND RESPONSIBILITIES

1. Stormwater management facilities.
 - a. Subdivider or land developer responsibilities.
 - (1) All stormwater management facilities, including detention and retention basins designed and constructed for the purposes specified under this chapter, shall be maintained in proper working order in accordance with the plans filed and approved by the Township and in accordance with any deed restrictions or notes on the plans. The subdivider or land developer must make adequate provisions for the perpetual maintenance of all stormwater management facilities proposed by the subdivision or land development plan.
 - (2) The subdivider or land developer shall, in addition, provide for an easement enabling the Township to perform emergency maintenance in the event that the property owner should fail to do so and shall establish a procedure whereby the Township shall be able to assess the cost of such emergency maintenance upon the owner of the land where the detention basin or other stormwater management facility is located by the filing of a municipal lien.
 - b. In order to ensure proper maintenance and function of stormwater management facilities, the Township or its designee may perform inspections.

- c. If, at any time, the Township or its designee discovers any violation or condition not conforming with the designs and plans filed with the Township in regard to the operation of a stormwater management facility, it shall notify the responsible owners of the violation, informing them of the nature of such violation and the manner in which it can be corrected.
 - d. Under no circumstances shall any person be allowed to remove any previously approved stormwater management facility unless an approved alternate facility is approved by the Township.
 - e. Under no circumstances shall any person be allowed to modify, alter or change a previously approved stormwater management facility unless approved by the Township.
 - f. In the event that the landowner, developer or homeowners' association, as the case may be, shall refuse or neglect to comply with the provisions of this section as interpreted by the Township, the Township may direct the work to correct any violation or noncompliance with the terms of this chapter and all other ordinances and codes of the Township of Germany and institute action for payment of costs incurred.
2. Storm drainage system and watercourses.
- a. Maintenance of all drainage facilities and watercourses within any subdivision and/or land development is the responsibility of the landowner or developer until and unless they are accepted by the Township.
 - b. It is the responsibility of any landowner or developer doing any act on or across a watercourse or swale or upon the flood plain or right-of-way thereof to maintain as nearly as possible in its present state, the stream, watercourse, swale, floodplain or right-of-way for the duration of the construction activity and to return it to its original or equal condition after such activity is completed.
 - c. Maintenance of drainage facilities or watercourses originating on private property is the responsibility of the owner to their point of open discharge at the property line or at a watercourse within the property.
 - d. No landowner or developer shall block, impede the flow of, alter, construct any structure, or deposit any material or commit any act which will affect normal or flood flow in any watercourse without having obtained prior approval from the Township and the Pennsylvania Department of Environmental Protection.

508 – EROSION AND SEDIMENTATION

All development applications which involve grading or excavation shall conform to the requirements of the rules and regulations of the Pennsylvania Department of Environmental Resources pertaining to erosion and sedimentation. It shall be the responsibility of the applicant to secure approval of the Department of Environmental

Resources. Approval of plans by the Township shall not be construed as approval under such regulations.

509 – FLOODPLAIN

1. The floodplain corridor shall be defined and established as the area of inundation which functions as a storage or holding area for flood water to a width required for a one hundred (100) year flood, as delineated in one of the following reports:
 - a. A hydrologic report prepared by an individual registered in the Commonwealth of Pennsylvania to perform such duties.
 - b. A hydrologic report prepared by an agency of the U.S. Government.
2. In case of any dispute concerning the boundaries of a floodplain corridor, the Township shall determine the ultimate location.
3. Whenever a floodplain corridor is located within or along a proposed land development, the plan shall include the location of the floodplain corridor with a plan note that:
 - a. The floodway shall be kept free of structures, fill, and other encroachments.
 - b. Any structures located within the floodway fringe shall be floodproofed to the limits of the floodplain corridor.
4. All floodplain lands shall be excluded in the minimum lot area calculations. Additionally, the floodplain and/or floodway area shall be identified by elevation or by approximate distance from the centerline of the stream channel. Floodplain and floodway lines need not be identified by distances and bearings.
5. No subdivision land/or land development, or part thereof, shall be approved if the proposed development and/or improvements will individually or collectively, increase the one hundred (100) year flood elevation more than one (1) foot at any point.
6. If the Township determines that only a part of a proposed subdivision can be safely developed, the Township shall limit development to that part and shall require that development proceed consistent with this determination.

510 – UNDERGROUND UTILITY LINES

Electric, telephone, and all other utility facilities shall be installed underground and shall be floodproofed up to the regulatory flood elevation. The developer shall be required to obtain a letter from the appropriate utility company confirming that the developer has entered into an agreement to provide for an underground electric and telephone system in accordance with the Pennsylvania Public Utility Commission Investigation Docket #99, as amended, or has obtained a waiver from said Pennsylvania Public Utility Commission to allow overhead electric and telephone facilities.

511 – PETROLEUM LINES

When any petroleum or petroleum products transmission line traverses a land development, the developer shall confer with the applicable transmission or distributing company to determine the minimum distance which shall be required between each dwelling unit and the centerline of such petroleum or petroleum products transmission line.

512 – NATURAL GAS LINES

The minimum distance from a natural gas line to a dwelling unit shall be as required by the applicable transmission or distributing company, or as shall be required by the Department of Transportation under the Natural Gas Pipeline Safety Act of 1968, as amended whichever is greater.

513 – DEDICATION OF LANDS FOR LOCAL RECREATION AND OTHER PUBLIC SITES

1. In subdivisions which are intended to provide housing for more than four (4) families, the Township shall consider the need for suitable open areas for recreation and shall make recommendations thereon.
2. The land to be dedicated shall be suitable in size, shape, topography, and general character for the proposed use.

<u>FAMILIES SERVED</u>	<u>MINIMUM ACREAGE TO BE RECOMMENDED</u>
5 - 15	10,000 sq. ft.
15 – 20	20,000 sq. ft.
50 –100	1 acre
Each additional 100	1 acre

3. Such lands shall not be included in the area required for tot lots in Section 407 of this Ordinance. In lieu of dedication of recreational areas, the developer and the Township may agree on a capital contribution to be made by the developer to an existing or proposed park program.

514 – WATER AREAS

In a development abutting a lake, river, or other significant water body, the Board of Supervisors, upon consultation with the Planning Commission, may request the dedication or reservation of:

1. Any title to the water body the developer may possess beyond the wharf or dock line for public use.
2. Up to twenty percent (20%) of the land abutting the shore for public use.

515 – RESERVATIONS

On sites reserved for eventual public acquisition, no building development is permitted during the period of reservation. Said period of time not to extend more than twelve (12) months without consent of the developer. Such reservations shall be noted on the Final Plan.

516 – COMPLETION OF IMPROVEMENTS OR GUARANTEE THEREOF; PREREQUISITE TO FINAL PLAN APPROVAL

No plan shall be finally approved unless the streets shown on such plan have been improved to a mud-free or otherwise permanently passable condition, or improved as may be required by this Ordinance, and any walkways, curbs, gutters, street lights, fire hydrants, shade trees, water mains, sanitary sewers, storm drains and other improvements required by this Ordinance. In lieu of the completion of any improvements required as a condition for the final approval of a plan, the Supervisors shall require, for deposit with the Township, a corporate bond, or other financial security acceptable to the Supervisors in an amount sufficient to cover the costs of any improvements which may be required, which financial security may include among others, a lending institution letter of credit or a restrictive or escrow account in a lending institution. Such bond, or other security shall provide for, and secure to the public, the completion of such improvements required for the final approval within one (1) year of the date fixed in the subdivision plat for completion of such improvements. The amount of financial security shall be equal to one hundred ten percent (110%) of the cost of the required improvement for which financial security is to be posted. In the case where the developer is projected over a period of years, the Supervisors may authorize submission of final plans by sections or stages of development subject to such requirements or guarantees as it find essential for the protection of any finally approved section of the development.

In the event a corporate bond or other financial security has been offered in lieu of completion of improvements for final plan approval, the developer shall construct and maintain a passable roadway, along with any other improvements required for lots which are occupied prior to acceptance of the roadway and/or other improvements by the Township. Such maintenance shall continue for the entire bonded period.

517 – RELEASE FROM IMPROVEMENT BOND

When the developer has completed all of the necessary and appropriate improvements, the developer shall notify the Supervisors in writing, by certified mail, of the completion of the aforesaid improvements and shall send a copy thereof to the Township Engineer. The Supervisors shall, within ten (10) days after receipt of such notice, direct and authorize the Township Engineer to inspect all of the aforesaid improvements. The Township Engineer shall, thereupon, file a report, in writing, with the Supervisors, and shall promptly mail a copy of the same to the developer by certified or registered mail. The report shall be made and mailed within thirty (30) days after the receipt by the Township Engineer of the aforesaid authorization by the Supervisors; said report shall be detailed and shall indicate approval or rejection of said improvements, either in whole or in part, and if said improvements, or any portion thereof, shall not be approved or shall be rejected by the Township Engineer, said report shall contain a statement of reasons for such non-approval or rejection.

The Supervisors shall notify the developer, in writing by certified or registered mail of the action of the Supervisors with relation thereto.

If the Supervisors or Township Engineer fails to comply with the time limit contained herein, all improvements shall be deemed to have been approved and the developer shall be released from all liability, pursuant to its performance guaranty bond or other security agreement.

If any portion of the said improvements shall not be approved or shall be rejected by the Supervisors, the developer shall proceed to complete the same and upon completion, the same procedure of notification, as outlined in this Ordinance, shall be followed.

Nothing in this Ordinance, however, shall be construed in limitation of the developer's right to contest or question by legal proceedings or otherwise, any determination of the Supervisors or the Township Engineer.

Where reference is made in this Ordinance to Township Engineer, he shall be a duly registered professional engineer employed by the Township or engaged as a consultant to the Township.

518 – REMEDIES TO EFFECT COMPLETION

In the event that any improvements which are required have not been installed as provided in this Ordinance or in accord with the approved final plan, the Township is hereby granted the power to enforce any corporate bond or other security by appropriate legal and equitable remedies. If proceeds of such bond, or other security are insufficient to pay the cost of installing or making repairs or corrections to all the improvements covered by such security, the Township may, as its option, install part of such improvements in all or part of the subdivision or land development and may institute appropriate legal or equitable action to recover the moneys necessary to complete the remainder of the improvements. All of the proceeds, whether resulting from the security or from any legal or equitable action brought against the developer, or both, shall be used solely for the installation of the improvements covered by such security, and not for any other Township purpose.

519 – DEDICATION OF IMPROVEMENTS

Upon installation by the developer and subsequent inspection by the Township Engineer, the developer shall take final steps to dedicate the improvements and have them accepted by the Township. The recording of the Final Plan, following approval by the Board of Supervisors, has the effect of an irrevocable offer to dedicate all streets and other public ways and areas to public use. The offer, however, does not impose any duty on the Township concerning maintenance or improvements until the proper authorities of the Township have made actual acceptance, either by Ordinance or resolution.

520 – LANDSCAPING (Section added 2-2000) (Revised 7-2008)

520-A - DEFINITIONS

DECIDUOUS PLANT- A woody perennial which loses its foliage at the end of each growing season.

DENSE SCREEN - A series of vegetative plantings which provides essentially an opaque screen.

DRIP LINE – An imaginary ground line around a tree that defines the limits of the tree canopy.

FOUNDATION AREA – The ground area immediately adjacent to a building on all sides thereof. Foundation areas extend a minimum of four (4) feet in all directions from the foundation of the building.

GROUND COVER - A low perennial, can be flowering, (excluding annuals and turf grasses) with a mature height of between three (3) and eighteen (18) inches.

LANDSCAPING – Defined as any combination of living plants, such as trees, shrubs, vines, ground covers, flowers, or grass; natural features such as rock, stone, bark chips, or shavings; and structural features, including but not limited to, fountains, reflecting pools, outdoor art work, screen walls, fences, or benches.

LANDSCAPE PLAN – The preparation of graphic and written criteria, specifications, and detailed plans to arrange and modify the effects of natural features such as plantings, ground, and water forms, circulation, walks, and other structural features.

ISLAND – In parking area design, a raised planting area, either terminal or landscape divider strip, usually curbed, and placed to guide traffic, separate lanes, limit paving (impervious surface), preserve existing vegetation, and provide space for landscaping which helps to screen and shade parking lots for the purpose of minimizing heat gain.

PARKING AREA - That area within an off-street parking lot which includes any paved surface within ten (10) feet of a parking space.

PLANTING UNIT (PU) - A unit of measure used to determine the quantity of plantings required in a residential, commercial, industrial, or other development project. For the purposes of this chapter, one planting unit (PU) equals one (1) major deciduous tree, two (2) minor deciduous trees, two (2) evergreen trees, five (5) shrubs, or 500 square feet of ground cover.

REGISTERED LANDSCAPE ARCHITECT – A person who holds a license to practice landscape architecture as defined in and in accordance with Pennsylvania and/or Maryland state law.

SCREENING – A method of visually shielding or obscuring one abutting or nearby structure or use from another by fencing, walls, berms, or densely planted vegetation or a combination thereof.

SHRUB - A multi-stemmed woody plant differing from a tree by its low stature and habit in branching from the base.

TREE CALIPER – The thickness of a tree trunk as measured six inches (6”) above the natural ground level at the base of the trunk, for trees up to four inches (4”) in caliper. For trees above four inches (4”) in caliper, the thickness of the trunk should be measured twelve inches (12”) above the natural ground level at the base of the trunk

TREE, EVERGREEN – Any self-supporting woody plant with one (1) well-defined trunk, a conical shape and needle-like or scale-like foliage retained year-round which attains a height of at least twenty-five (25) feet at maturity, with a 5’ minimum height at time of planting. See Section F & G for recommended trees and trees not recommended or allowed.

TREE, MAJOR DECIDUOUS - An overstory/ canopy tree with a minimum mature height of over thirty (30) feet and a minimum caliper at the time of planting of one and one-half (1 ½”) inches or minimum 1/2” caliper and 4’ to 5’ height when used for Section C-2.c. (1) (b) reforestation option. See Section F & G for the type of trees considered major deciduous trees and those recommended for use and those not recommended or allowed.

TREE, MINOR DECIDUOUS – An understory or small tree type that typically will attain a mature height of at least ten (10’) feet but generally not over thirty (30’) feet and a minimum caliper at the time of planting of one (1”) inch. See Section F & G for the type of trees considered minor deciduous trees and those recommended for use and those not recommended or allowed.

TREE PROTECTION ZONE – The area around a tree corresponding to the drip line of the tree canopy or ten (10) feet in all directions from the trunk.

520-B - LANDSCAPE PLANS

1. Purpose. It is the purpose of this section to establish minimum standards for the provision, installation and maintenance of landscape plantings in order to protect the health, safety and welfare of the community. Furthermore, it is the intent of this section to:
 - a. Improve environmental quality by recognizing the numerous beneficial effects of landscaping upon the environment, including but not limited to the improvement of air quality, the maintenance of areas essential for storm water management and aquifer recharge and reducing air, noise, heat and chemical pollution.
 - b. Provide direct and important physical and psychological benefits through the use of landscaping to reduce noise and glare and to soften the harsher aspects of development.

- c. Preserve existing natural vegetation and incorporate native plants and plant communities into landscape design.
 - d. Establish procedures and standards for the administration and enforcement of the landscaping requirements of this chapter.
2. Content. When a landscape plan is required as part of the subdivision and land development process, the landscape plan shall provide the following:
- a. Be prepared and stamped by a Landscape Architect registered in the state of Pennsylvania or Maryland or someone who can demonstrate a knowledge of landscape design and horticulture which is adequate for the project's size and scope as determined by the Township.
 - b. Be drawn at a minimum scale of one (1) inch to fifty (50) feet and include appropriate dimensions and distances. The Township may require larger scale plans if needed to adequately show landscape detail.
 - c. Show the location of existing boundary lines and dimensions of the tract, existing and proposed streets, access drives and parking areas, and proposed land usage.
 - d. The location of existing and proposed utility easements on or adjacent to the tract, including the location of overhead power lines.
 - e. The location and species of existing trees having a minimum caliper of four (4) inches. Designate trees with a graphic symbol depicting the trunk caliper and current plant spread. Large grouping of trees can be designated showing the tree grouping outer edge of tree trunks and the outer edge of the canopy or drip line, with a general description of predominant tree types, size, quantity and health.
 - f. The location, sizes and type of proposed and preserved landscaping and the size of the proposed landscape area. Botanical nomenclature as well as common names must be included. Groundcover types and shrub masses shown using limits of the planting mass. Designate location of proposed trees with a graphic symbol depicting mature plant spread.
 - g. The description of the methods that shall be used to protect existing trees from damage during construction.
 - h. Show all required clear sight triangles for road and driveway intersections.
 - i. Provide planting specifications that include the 520-D installation standards and 520-E maintenance requirements that are applicable to the landscaping proposals shown on the plan. Additional applicable standards and requirements should be included where needed and not conflicting with SALDO requirements.

- j. Include a table clearly displaying the relevant information necessary for the Board of Supervisors to evaluate compliance with the provisions of this chapter. Such a table shall include gross acreage, acreage of preservation areas, quantity and size of proposed and preserved plant materials, calculation showing plant units required and plant units provided, and other such information as the Board of Supervisors may require.

520-C - REQUIREMENTS FOR LAND DEVELOPMENTS

All subdivisions and land developments shall adhere to the following landscaping standards.

1. Quantity of Landscaping: The following quantities of landscaping shall be provided.
 - a. Single-Family Detached and Single-Family Semi-Detached Developments
 - (1) For developments with an average lot width of one hundred fifty (150) feet or greater, one (1) major deciduous tree shall be required for every eighty (80) feet of road frontage along both sides of all streets within the development.
 - (2) For developments with an average lot width of less than one hundred fifty (150) feet, one major deciduous tree shall be required for every fifty (50) feet of road frontage along both sides of all streets within the development.
 - b. Attached Residential Development: Single-Family Attached (Townhouse), Multifamily developments and Mobile Home Parks as well as developments with a mixture of dwelling unit types, shall comply with the following quantity requirements.
 - (1) General Standard: A minimum of two (2) planting units for every dwelling unit shall be provided.
 - (2) Street Trees: In addition to the general standard, the following quantity of street trees shall be provided.
 - (a) One (1) major deciduous tree shall be required for every twenty (20) feet of street centerline of streets interior to the development.
 - (b) One (1) major deciduous tree shall be required for every forty (40) feet of street centerline of streets adjacent to the development.
 - c. Nonresidential Development: Nonresidential developments shall comply with the following quantity requirements.
 - (1) General Standard: A minimum of two (2) planting units for every one thousand (1000) square feet, or fraction thereof, of building coverage shall be provided.

- (2) Street Trees: In addition to the general standard, the following quantity of street trees shall be provided.
 - (a) One (1) major deciduous tree shall be required for every twenty (20) feet of street centerline of streets interior to the development.
 - (b) One (1) major deciduous tree shall be required for every forty (40) feet of street centerline of streets adjacent to the development.

- d. Parking Lots Planting: In addition to the above quantity standards, the following quantities of landscaping are required for off-street parking lots associated with any type of development.
 - (1) Terminal Islands: One (1) major deciduous tree shall be provided in every terminal island.
 - (2) Divider Strips: One (1) major deciduous tree and four (4) shrubs shall be provided in every forty (40) foot interval within the landscaped divider strip.
 - (3) Parking Lot Perimeter: One (1) major deciduous tree shall be provided for every forty (40) foot interval around the perimeter of a parking lot, except where the parking lot is bounded by a principal structure. Where the parking lot perimeter planting can also serve as the required Section C-2.c “Buffering and Screening” along the site boundary, the (c) “Evergreen Option” and (e) “Shrubs Option” can be utilized in addition to this requirement of one major tree every 40 feet.
 - (4) See Section 520-C-1-c “Buffering and Screening” for additional buffering requirements.

- e. Credit for Existing Vegetation: Within any development type, credit for up to fifty percent (50%) of the minimum landscaping quantity requirements of Sections 520-C.1(a) through 520-C.1(d) may be applied in return for retaining existing major deciduous trees on the development site, provided that the following conditions apply.
 - (1) The major deciduous trees are in good health.
 - (2) The major deciduous trees are located within twenty-five (25’) feet of at least one (1) dwelling unit or a nonresidential use (as may be applicable) or are located where planting units are required in accordance with Section 520-C.2 below.
 - (3) The applicant agrees to replace any major deciduous tree which contributed to the minimum quantity of landscaping required by Sections 520-C1(a) through 520-C.1(d) with another major deciduous tree if it should die or become significantly unhealthy, in the opinion of

a horticulturist or comparable landscaping professional, within two (2) years of the completion of the development.

- f. Additional Plantings to Meet Design Requirements: The planting quantity requirements of Sections 520-C.1(a) through 520-C.1 (e) shall be considered as minimum planting requirements for proposed development. Where additional plantings are required to meet specific planting placement or arrangement requirements of Section 520-C.2 below, such additional plantings shall be provided.
2. Additional Landscape Design and Planting Quantity Requirements: All landscaping plans shall comply with the following design requirements.
- a. Street Trees: Where street trees are required, said street trees shall be located in accordance with the following requirements.
 - (1) For all streets with curbs and sidewalks, street trees shall be placed between the curb and the sidewalk. A planting strip of no less than six (6) feet shall be provided between the curb and the sidewalk, and the required street trees shall be placed in the middle of the planting strip.
 - (2) For all streets with curbs but no sidewalks, street trees shall be placed a minimum of three (3) feet from the curb. However, the street trees shall be located in a manner that will allow the installation of sidewalk in the future in a manner consistent with the sidewalk requirements of Section 520-C.2a(1) above.
 - (3) For streets without curbs and sidewalks, street trees shall be placed outside of the street right-of-way line, but no further than ten (10) feet from the right-of-way line.
 - b. Parking Lots Design: All parking lots shall comply with the following parking lot design requirements.
 - (1) Parking lots with twenty-five (25) or more parking spaces shall be designed in accordance with the following standards.
 - (a) Terminal islands shall be provided at both ends of all rows of parking spaces. Terminal islands shall be designed to protect parked vehicles and to help define the traffic circulation pattern of the parking lot.
 - (b) All terminal islands shall be a minimum of five (5) feet in width and fifteen (15) feet in length.
 - (c) Divider strips shall be provided between abutting rows of parking. Divider strips shall be designed to define the traffic circulation pattern of the parking lot and to help separate pedestrian and vehicle traffic.
 - (d) Divider strips shall be a minimum of five (5) feet in width.

- (e) Curbing or wheel stops shall be provided around all terminal islands and divider strips to prevent vehicular encroachment.
 - (f) The parking lots need to be surrounded with a perimeter landscaping strip with a minimum width of ten feet measured outward from the edge of the parking lot except where one side of the parking lot is bounded by a principal structure. This perimeter landscaping strip shall be planted as required in Section 520-C-d-(3) and landscaped with appropriate ground cover, shrubs or grass.
- (2) Parking lots with fewer than twenty-five (25) parking spaces are not required to be designed to include terminal islands and / or divider strips. However, the plantings required around the perimeter of parking lots, as required in Section 520-C.1.d (3) above shall be arranged to provide for visual buffering of the parking lot from public streets and adjoining properties and to provide shade within the parking lot itself.
- c. Buffering and Screening: The landscaping plan for all manufacturing/ industrial uses and for all commercial /business uses with a building footprint exceeding two thousand (2,000) square feet shall provide for buffering and screening along the boundary between the use and any adjoining residential property. Buffering and screening from any use shall be required around the perimeter of a mobile home park and the perimeter of the required mobile home park recreation area. Buffering and screening plantings shall be required in accordance with the following requirements, and shall lessen the visibility, glare, and noise from the use when viewed from the adjacent property.
- (1) Buffer /Screen Planting Options: Buffer/screen plantings shall be provided in accordance with one of the following options (See C-2 for utilizing a combination of options.):
 - (a) Canopy Tree Option: One (1) major deciduous tree for every forty (40) linear feet.
 - (b) Reforestation Option: Three (3) major deciduous trees (minimum ½" caliper, 4' to 5' high) for every forty (40) liner feet.
 - (c) Evergreen Option: One (1) evergreen tree for every fifteen (15) linear feet.
 - (d) Flowering Tree Option: One (1) minor deciduous tree of a flowering variety for every twenty-five (25) feet.
 - (e) Shrubs Option: One (1) evergreen or deciduous shrub for every six (6) feet.
 - (2) Buffer/ screening designs that incorporate a variety of the options listed in Section 520-C.2.c (1) are strongly encouraged, provided

Example: For a two hundred (200) foot boundary, the following combination of options could be used.

- Canopy Tree: Provide three (3) major deciduous trees. Accounts for one hundred twenty (120) feet of the buffer/screen.
- Flowering Tree: Provide three (3) minor deciduous flowering trees. Accounts for seventy-five (75) feet of the buffer/screen.
- Shrub: Provide one (1) shrub. Accounts for six (6) feet of the buffer /screen.

Total Buffer/ Screen: The plant combination above provides a two-hundred one (201) foot buffer/ screen.

- (3) In addition, the Township may require this buffering and screening for sites with less than 2,000 s.f. and also require additional or other forms of buffering where determined necessary to further lessen negative impact on adjacent residential property and use.

Additional plantings, earth berms, buildings, or a solid fence or wall high enough to provide adequate buffering and screening could be required instead of, in combination with, or in addition to the requirements outlined in this section and Section 502-C-1-d-(3) "Parking Lot Perimeter."

- (4) Credit for Existing Vegetation: Existing Plants within the buffer/ screening area that meet the criteria of one of the options listed in Section 520-C.2.c (1) may be applied toward meeting the minimum required buffer/ screen planting requirements. Where existing vegetation is applied toward meeting the required buffer/ screen planting requirements, the landscaping plan shall identify each specific plant by species and indicate the planting option from Section 520-C.2.c (1) to which the specific plant is applied. Where an existing plant is a species listed in Section 520-G, such plant shall not be permitted to be applied toward meeting the buffer/ screen planting requirements.

520-D - INSTALLATION STANDARDS

1. The landscape contractor shall furnish and install and/or dig, ball, burlap or transplant all plant materials listed on the landscape plan. Bare root is not permitted for any tree.
2. All plants shall be nursery grown. Plants taken from cold storage shall not be acceptable.

3. A professional horticulturist/nurseryman shall be consulted to determine proper time to move and install plant material so that stress to the plant is minimized. Planting of deciduous material may occur during winter months, provided that there is no frost in the ground and frost-free topsoil planting mixtures are used.
4. The landscape contractor shall excavate all plant pits, hedge trenches and/or shrub beds as follows:
 - a. All pits shall be generally circular in outline, with vertical sides. Tree pits shall be deep enough to allow 1/8 of the ball to be above the existing grade. Tree pits must be a minimum of ten (10) inches larger on every side than the ball of the tree.
 - b. If areas are designated as shrub beds or hedge trenches, they shall be cultivated to at least eighteen (18) inches in depth. Areas designated for ground cover shall be cultivated to at least twelve (12) inches in depth.
5. After cultivation, all plantings shall be mulched with a minimum three (3) inch layer of organic mulch or another similar material, approved by the Township Supervisors, over the area of the planting.

520-E - MAINTENANCE REQUIREMENTS

1. General. The owner of land subject to this chapter shall be responsible for the maintenance of landscaping in good condition so as to present a healthy, neat and orderly landscape area.
2. Pruning. All pruning should be accomplished according to good horticultural standards. Plants shall be pruned only as necessary to promote healthy plant growth. Unless approval is provided by the Board of Supervisors, plants shall be allowed to attain their normal size and shall not be severely pruned in order to permanently maintain growth at a reduced height.
3. Mowing. Grass shall be mowed as required to encourage deep root growth. Ideal recommended mowing height is three (3) inches.
4. Edging. All roadway, curb and sidewalk components included in such landscape plans shall be edged and pruned as needed to prevent encroachment from adjacent landscaped areas.
5. Watering.
 - a. General. All watering of planted areas shall be managed so as to:
 - (1) Maintain healthy flora;
 - (2) Make plant material more drought tolerant;
 - (3) Avoid excessive turf growth;

- (4) Minimize fungus growth;
 - (5) Stimulate deep root growth;
 - (6) Minimize leaching of fertilizer; and
 - (7) Minimize cold damage.
- b. Promote vegetation growth. Watering of vegetation should always be in a sufficient amount to thoroughly soak the root ball of the plant and surrounding area, thereby promoting deep root growth and drought tolerance.
6. Safety. All sight triangles shall remain clear, and any plant which could endanger safety such as unstable limbs shall be removed and the plant material replaced. It shall be the responsibility of the property owner to ensure all plantings and architectural elements are maintained to provide a safe environment.
7. Landscape guarantees. All landscaping required by this chapter shall conform to the following guarantees:
- a. The installation of required landscaping, in accordance with the approved landscape plan, shall be guaranteed in accordance with the requirements of Section 516 of this chapter.
 - b. In addition, any required vegetative element, which dies within eighteen (18) months of planting, shall be replaced by the developer. Any vegetative element which, within eighteen (18) months of planting or replanting, is deemed, in the opinion of the Building Permit Officer, not to have survived or to have grown in a manner uncharacteristic of its type shall be replaced. Substitutions for certain species of plants may be made only when approved by the Board of Supervisors.
 - c. Bonding. The applicant shall provide the township a bond equal to one hundred and ten (110%) percent of the estimated cost of plants, plant installation and 18 month plant guarantee.

520-F - RECOMMENDED TREE PLANTING LIST:

List of trees suitable to the area climate and soil conditions. Other plants can be allowed if requested and found acceptable to the Township. Tree plantings should include a mixture of tree species to avoid losing all the trees due to a problem with one species.

Major Deciduous and Canopy Trees

Trees suitable for street tree and other tree planting in open, unobstructed areas:

Common Name	Scientific Name
Hedge Maple	Acer Compestre
Swamp Red Maple	Acer Rubrum

Sugar Maple	Acer Saccharum
Common Hackberry	Celtis Occidentalis
Thornless Honeylocust	Gleditsia Triacanthos
Steril American Sweetgum	Liquidambar Styraciflua Rotundiloba
Black Gum	Nyssa Sylvatica
Pin Oak	Quercus Palustris
Red Oak	Quercus Rubra
American Linden	Tilia America
American Liberty Elm	Ulamus Americana "America Liberty Elm"
Shumard Oak	Quercus Shumardii
Swamp White Oak	Quercus Bicolor
London Plain Tree	Platanus Acerifolia
Sycamore	Platanus Occidentalis
White Oak	Quercus Alba

Minor Deciduous Trees

Trees suitable for street tree and other tree planting under low power lines and space restricted locations.(use tree form for street trees)

Common Name	Scientific Name
Juneberry	Amelanchier Grandiflora
Eastern Redbud	Cercis Canadensis
White Fringetree	Chionanthus Virginicus
Flowering Dogwood	Cronus Florida
Kousa Dogwood	Cornus Kousa
Carolina Silverbell	Halesis Carolina
Hawthorne Species	Crataegus
American Hornbeam	Carpinus Caroliniana
American Yellowwood	Cladrastis Kentukea

Evergreen Trees

Common Name	Scientific Name
White Fir	Abies Concolor
Leyland Cypress	Cupressocyparis Leylandii
Eastern Red Cedar	Juniperus Virginiana
Norway Spruce	Picea Abies
Pitch Pine	Pinus Rigida
Pinus Strobus	Eastern White Pine
Virginia Pine	Pinus Virginiana
Eastern Arborvitae	Thuja Occidentalis

520-G - TREES NOT PERMITTED

The following trees are not recommended for new plantings and under no circumstances shall they be planted as street trees:

- Varieties of Poplars
- Varieties of Willows
- White or Silver Maple Acer Saccharinum

Varieties of Aspen
Common Black Locust
Norway Maple
Bradford Pear
Tree of Heaven—*Alanthus Altissima*
Black Walnut- *Juglans Nigra*
Horse Chestnut – *Aesculus Hippocastanum*