CONSTRUCTION CODE
for the
SUBDIVISION REGULATIONS
of
SENECA COUNTY, OHIO

ADOPTED: September 18, 1997
REVISED: December 26, 2002

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ARTICLE 1
GENERAL CONSIDERATION

100 PURPOSE

The purpose of these rules and regulations as adopted by the Seneca County Board of Commissioners, hereinafter referred to as the COUNTY COMMISSIONERS, is to provide standard construction specifications for subdivision development in Seneca County, Ohio, and to define the minimum requirements for surveying, engineering and construction as applied to land development.

101 AUTHORITY

The COUNTY COMMISSIONERS are authorized to adopt general rules and regulations setting standards and requiring and securing the construction of improvements shown on the plats and plans required by Section 711.05, 711.09 and 711.10 of the Ohio Revised Code under Section 711.101.

102 JURISDICTION

These Regulations shall be applicable to all subdivisions hereinafter made of land located within the unincorporated areas of Seneca County, except land within three (3) miles of a city or one and one-half (1½) miles of an Incorporated Village if the Township does not have zoning (section 711.09 of the Ohio Revised Code).

103 INTERPRETATION

The requirements as set forth in these Regulations shall be construed to be minimum.

104 ADOPTION

These Regulations became effective after the necessary public hearings and adopted September 18, 1997 by the COUNTY COMMISSIONERS in accordance with Chapter 711.101 of the Ohio Revised Code.

105 AMENDMENT

These Regulations may be amended in accordance with the same procedure as stated in Section 104 of these Regulations.

106 RELATION TO OTHER LAWS

The provisions of these Regulations shall supplement any and all laws of the State of Ohio, resolutions of the County, or any and all rules and regulations promulgated by authority of such law or resolution relating to the purpose and scope of these Regulations.

ARTICLE 2
CONSTRUCTION DESIGN STANDARDS

200 PURPOSE

The following design standards shall control the manner in which the improvements within developments are designed for construction. These standards are required to insure the safety and welfare of the general public and are minimum standards.

If found necessary by the County Engineer, the Board of Seneca County Commissioners may require more stringent standards than those required herein.

201 STREET DESIGN

A. Street Classification

Street classification is the designation of streets according to function and volume of traffic. Each classification shall be as in Table 200/2, "Minimum Street Standards," page 7 of these Regulations.

B. Design Speeds

Design features shall be consistent with a design speed selected as appropriate for the conditions and type of street. The design speeds shown in Table 200/2 shall be used.

C. Right-of-Way Width

The right-of-way width for all streets shall be as shown in Table 200/2, "Minimum Street Standards," or as required by the Planning Commission. The street right-of-way shall be clear of all obstructions for its full width unless the County Engineer finds that any obstructions left within the right-of-way will not interfere with the general traveling public of the County.

D. Gradient

The gradient for all streets shall be shown in Table 200/2, "Minimum Street Standards," by classification except where other grades are approved by the County Engineer.

E. Vertical Alignment

Profile grades shall be connected by vertical curves to provide adequate stopping sight distance for the required design speed for each type of street. To determine the minimum length of curve requirements, multiply the algebraic difference in grades by the coefficient "K". For "K" values, see Table 200/1, "Minimum Sight Distance".

TABLE 200/1
MINIMUM SIGHT DISTANCE IN FEET

Design Speed mph	20	30	35	40	45	50	55
Stopping Sight Distance* -feet	125	200	225	275	325	400	450
"K" Value For: **							
Crest Vertical Curve	10	30	40	60	80	110	150
Sag Vertical Curve	20	40	50	60	70	90	100

NOTE: *Minimum stopping sight distances as shown are for height of eye at 3.50 feet and height of object at 0.5 feet.

**K Value is a coefficient by which the algebraic difference of grades may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

F. Horizontal Alignment

Sudden changes between curves of widely different radii or between long tangents and sharp curves shall be avoided. For the maximum curvature for different design speeds, see Table 200/2, "Minimum Street Standards." Where possible, a tangent of at least 100 feet shall be introduced between reverse curves on thoroughfare, collector, commercial and industrial streets and at least 50 feet on principal and minor residential streets.

G. Pavement Width

The pavement width for each type of street, based on traffic and type of use, shall be as shown in Table 200/2. These widths shall be considered as the minimum width allowed.

H. Graded Shoulders

Minimum width of graded shoulder for various traffic volumes and design speed shall be as shown in Appendix A, Figures 1 and 2. Shoulder width is measured from the edge of pavement to the point where the shoulder intersects the side slope. Where guardrail posts are used, the shoulder width shall be increased by 2 feet.

TABLE 200/2
MINIMUM STREET STANDARDS

Classification	Design ADT Range	Design Speed	Right-of-Way Width	Grade Max. Min.	Vertical Alignment Crest Sag	Horizontal Alignment Min. Radius	Pavement Width	Shoulder Type
Thoroughfares	2000 & over							
Major		45	120	7 .5	60 60	700	36 B/B	Turf
Secondary		55	60-80	7 .5	110 90	830	28 E/E	Paved
Residential: Multi-Family	100 to 2000							
Urban		35*	60-80	8 .5	40 50	500	28 B/B	Turf
Rural		55	60-80	8 .5	110 90	830	28 E/E	Turf
Residential: Single Family	10 to 100							
Urban		45*	60	10 .5	80 70	700	28 B/B	Turf
Rural		55*	60	10 .5	110 90	830	28 E/E	Turf
Commercial and Industrial	N/A	40	70-80	6 .5	60 60	700	34 B/B 36 E/E	Turf Turf

NOTES:

Urban densities include both urban and suburban densities.
B/B - Pavement width is from back of curb to back of curb.
E/E - Pavement width is from edge of pavement to edge of pavement.
* - Lower design speeds need to have engineering basis from AASHTO with approval from the County Engineer.

I. Side Slopes

Side Slopes shall be as shown in the Typical Section, Appendix A, Figures 1 and 2.

J. Parking

Parallel parking on one side of a street where curb and gutter is required has been provided for in the minimum pavement widths in Table 200/2. Conditions of lot size and intensity of development may require additional on-street parking. On-street parking lanes in residential areas will be at least 8 feet in width and in multiple family residential, commercial, and industrial area parking lanes will be at least 10 feet. The parking lane width may include the gutter pan as part of the required width.

K. Improvements to Existing Streets

When there is development along an existing street or roadway, the developer shall be responsible for improvements to the right-of-way and the installation of storm drainage improvements required by these Regulations on his side of the street. Required improvements shall also include adjustments to existing pavement when required by the County Engineer. Where sight distance or other engineering requirements make it imperative, the pavement and drainage adjustment responsibility shall include the replacement of the entire existing system on both sides to insure the safety and welfare of the general public.

202 INTERSECTION DESIGN

A. Angle of Intersection

Streets shall be laid out to intersect as nearly as possible at right angles and no street shall intersect any street at any angle of less than 80 degrees.

B. Types of Allowable Street Intersection

T-type intersections are encouraged for residential no-through traffic streets. In no event shall an intersection in excess of a 4-leg intersection be utilized unless a rotary-type design is used and has been approved by the County Engineer.

C. Centerline Offsets at Centerline

Intersection offsets of less than 10 feet may be approved. However, if the offset is in excess of 10 feet, the values in Table 200/3 shall be used as minimums. Requests for variations shall be based on a traffic study performed by a Professional Traffic Engineer.

TABLE 200/3
INTERSECTION SPACING

	Residential Single Family	Residential Multi-Family	Thoroughfares	Industrial
Residential - Single Family	300	600	2640	1320

Residential - MultiFamily	600	600	2640	1320
Thoroughfares	2640	2640	2640	1320
Industrial	1320	1320	1320	1320

D. Grades

1. The grade on the through street shall be 3 percent or less unless approved by the County Engineer with a maximum allowable grade of 5 percent.
2. The grade on the stop leg of an intersection shall be 3 percent or less unless approved by the County Engineer with a maximum allowable grade of 5 percent.
3. To provide proper drainage at all intersections, the stop street legs of all intersections shall have a down grade of between 1.56 percent and 3.0 percent.
4. Standard drawings for intersection grade requirements are shown by Appendix A, Figure 3 & 4.

E. Cross Corner Sight Distance

Intersections shall be designed with adequate corner sight distance as shown in Appendix A, Figure 5.

F. Radius Returns

At intersection, the minimum radius returns shall be as shown in Table 200/4 and shall be measured from the outside edge of pavement or face of curb.

TABLE 200/4
RADIUS RETURNS

Street Classification	Radius
Residential	30 feet
Thoroughfares	50 feet
Industrial	50 feet

203 CUL-DE-SAC

Streets terminating in a permanent cul-de-sac turnaround, as shown in Appendix A, Figures 6 and 7, shall have a minimum right-of-way radius of 60 feet. The outer edge of pavement shall have a minimum radius of 40 feet (excluding curb and gutter). Cul-de-sacs with an island in the middle shall be properly drained by an adequate storm sewer system. Cul-de-sacs with island also shall have a minimum pavement of 24 feet, and in no case shall the outside edge of pavement be located within 15 feet of any right-of-way line. The maximum grade on cross slope in a cul-de-sac shall not exceed 4 percent.

204 TEMPORARY TURNAROUNDS

Where temporary turnarounds are permitted, they shall be provided with a temporary easement covering the portion of the turnaround which extends beyond the normal right-

of-way limits. Such temporary easement shall be automatically vacated for the use of the abutting property owner when said temporary turnaround is no longer needed for the public. If a temporary dead-end street extends only one lot past a street intersection, no turnaround will be required.

205 BRIDGES AND SPECIAL STRUCTURES

All bridges (clear spans ten feet and greater) and special structures shall be designed using Ohio Department of Transportation Standards except where other standards are approved by the County Engineer. The County Engineer's office will assign a bridge I.D. number to be used throughout design. A Professional Engineer, licensed to practice in Ohio, shall design and seal the plans. All structures shall be concrete (reinforced, prestressed etc.). See Table 200/5 for required loading, roadway clearance width and vertical clearance standards for each type of street. The waterway opening shall be designed for a minimum 25-year storm and checked for 50 and 100 year storm.

TABLE 200/5
MINIMUM STRUCTURE STANDARDS

Classification	Design Load	Roadway Clearance Width	Vertical Clearance
		Urban/Rural	
Thoroughfares	HS-20	40/32	15.0
Residential	HS-20	32/32	15.0
Commercial and Industrial	HS-20	40	15.0

206 STREET LIGHT

When developing adjacent to a village, the street light policy/pattern of said village will be extended into the development. When developing within the townships, the respective trustees may require street lighting within the new subdivision street and/or at major intersections.

207 STREET SIGNS

All necessary street signs shall be shown on the plans and are to be provided and erected by the developer in accordance with the Ohio Manual of Uniform Traffic Control Devices. Installation shall be under the directions of and with the approval of the County Engineer.

208 PAVEMENT MARKING

All necessary street paving marking is to be performed by the developer in accordance with the Ohio Manual of Uniform Traffic Control Devices under the direction of and with the approval of the County Engineer.

209 GUARDRAIL

Guardrail or guardposts will normally be required for all embankments 6 feet or higher. Guardrail and guardposts shall be the type as shown in Appendix A, Figure 8. The

developer should show all guardrail or posts on the construction plan for approval as to type 5 and location.

210 UNDERGROUND UTILITIES

Utilities, including gas pipes, telephone cables, electrical power and street lighting circuits, etc., shall be underground. Where underground electrical transformers are used, they shall be located in vaults. When electrical power cables are installed underground in a subdivision, electrical street lighting cables shall de-energized and protected against physical damage.

All construction of utility pipe, conduit, cable, wires, vaults and pertinent equipment shall comply with the current regulations of the Public Utilities Commission of Ohio and with the requirements of the public utility involved. All location drawings and/or detailed drawings of the utilities prepared by the developer and/or the utility companies shall be submitted to the County Engineer for approval.

Ohio Utilities Protection Service (OUPS) (800-362-2764) shall be called two working days before digging. Non-member utilities shall be called directly.

Utilities shall be located in a separate ten (10) foot utility easement at the back or front of lot along property line.

211 ORNAMENTAL CONSTRUCTION

If the developer elects to install a decorative fence or other ornamental construction it shall not be within the right-of-way limits, he shall show such construction on the plan and profile drawings, or submit separate drawings with sight distance provisions for approval by the County Engineer, the appropriate township trustees and the Board of County Commissioners.

212 CURBS AND GUTTERS

Curbs and gutters shall be the type 2 & 6 as shown in Appendix A, Figure 9, the developer shall submit complete detailed drawings for approval by the County Engineer. At all intersections with curbing, a curb ramp shall be provided as shown in Appendix A, Figure 10. Curbs and gutters shall be required within one mile of cities and may be required within one mile of villages.

213 SIDEWALKS

Sidewalks shall be made of Class "C" concrete 4 inches thick (6 inches thick under driveways) and at least 4 feet wide. In areas which have high pedestrian traffic, i.e., near schools, parks and commercial parks and commercial areas, sidewalks may be required to be wider than 4 feet. When sidewalks are required, the installation shall be the responsibility of the developer and shall be constructed within the two-year period during which the maintenance bond has been posted by the developer. A construction guarantee will be required for all sidewalks as described in Section 503. Sidewalk shall be required when curb and gutters are used.

214 FENCES

Fence, as shown in Appendix A, Figure 11, shall be required whenever either the County Engineer determines that hazardous conditions may exist as a result of man-made or natural physical conditions. Man-made conditions may result from such things as an open storm drainage intake or outfall at a culvert or drainage detention facility.

If the developer elects not to use the types of fence illustrated in Appendix A, Figure 11, he shall submit complete, detailed drawings of his proposed fence for review and approval by the County Engineer.

215 DAMS AND PONDS

Proposed dams or ponds which are to be part of the subdivision shall have plans submitted to the County Engineer for approval. If the dam or pond falls within the bounds of Section 1521.06 of the Ohio Revised Code, see Appendix B, Figure 1, the developer or his engineer shall apply for a permit from the State of Ohio, Department of Natural Resources, Division of Water. All ponds shall be setback thirty (30) feet from the right-of-way line.

No public road shall be built across a dam without approval from both the County Engineer and the Township Trustees of the township in which the development is located.

Construction of all dams shall be inspected by an ODOT certified testing firm. All construction inspection costs are the responsibility of the developer. Certification that the dam has been constructed to the proper standards must be supplied to the County Engineer.

Ponds of all sizes which could be used for fire protection, stormwater control and sedimentation control are encouraged.

216 TREES

All existing trees shall be removed from the street right-of-way unless found by the County Engineer not to interfere with the general traveling public. Trees should be located outside the street right-of-way when open ditches are along the street. Trees can be planted between the sidewalk and curb when no open ditches run along the street. Special care shall be taken at all times to make sure that trees planted in the subdivision do not interfere with utilities or impair visibility at intersections.

A. Species

The trees shall be species which are resistant to damage and disease and which do not cause interference with underground utilities or street lighting. The species size and location shall follow the O.D.N.R. Division of Urban Forestry (1-419-424-5004) specifications.

B. Location
No trees shall be planted within 40 feet of the intersection of two street right-of-way lines. Approaches to buildings should be considered when locating trees. No trees shall be planted within the street right-of-way where curbs and gutters are not provided.

C. Tree Size
Trees shall be at least one one-half inch in diameter measured one foot above the ground. Lowest branches shall be not less than 7 feet and no more than 10 feet above the ground.

217 STORMWATER MANAGEMENT, EROSION ANS SEDIMENT CONTROL
Note: For typical values of Manning's "n" Coefficients – see Appendix C

I. STORMWATER: MANAGEMENT

Purpose. These design standards and specifications shall serve as minimum requirements for the handling of surface water and drainage. These procedures and regulations shall govern the development of all new and/or modified drainage systems. The development of such drainage systems shall include the conveyance of surface water to an adequate outlet which is capable of carrying the flow.

A. Preliminary drainage plan. A preliminary drainage plan for all major subdivisions shall be submitted for review and preliminary approval by the Seneca County Engineer. Minor subdivision may be subject to drainage plan review as determined by the County Engineer. The plan shall show the general runoff pattern of the area which is to be improved as well as showing the runoff patterns of adjacent areas which affect or may be affected by the proposed improved area. A copy of the preliminary plan required by the Planning Commission may serve as the preliminary drainage plan. Sufficient data shall be supplied for the Seneca County Engineer to check the feasibility of the drainage system and stormwater runoff control as proposed by the developer. The preliminary drainage plan shall be approved prior to the preliminary approval of the subdivision plan by the Planning Commission.

B. Adequate drainage outlet. Surface water runoff of a development shall be drained off site in accordance with this code. The location of the adequate outlet shall be approved by the Seneca County Engineer. The adequate outlet may consist of a ditch, stream, storm sewer, or approved retention basins, having sufficient capacity to accommodate the surface water runoff in a reasonable manner.

C. Drainage easement. An minimum twenty-five (25) foot drainage easement on all storm sewers and (25) foot drainage easement with a (75) foot emergency easement shall be required along any drainage way, ditch, watercourse, stream. The easement shall be of sufficient width to allow cleaning, widening, deepening, replacement or other general maintenance of such drainage course as required by

the Seneca County Ditch Maintenance Department or other agency approved to maintain structures under said easement. When it is required of the developer to convey surface water outside the limits of the proposed improved area in order to discharge into an approved adequate outlet, it shall be the responsibility of the developer to obtain easements or right-of-ways for construction and/or maintenance of such drainage course. All drainage easements shall be shown on the final plat and construction plans. The drainage easements shall be recorded for public use and the maintenance of such drainage courses shall be the responsibility of the maintaining authority as specified.

D. Final drainage plan. A final drainage plan showing the entire drainage system shall be submitted with utility improvements to the Seneca County Engineer and the Seneca County Ditch Maintenance Department for construction approval. The final drainage plan shall conform to these regulations and to any special conditions that were required by the Planning Commission in approving the preliminary plat. The final plan shall include engineering calculations used in determining the design of the drainage courses, the drainage structures, and stormwater runoff control structures. The following shall serve as a minimum requirement for plans and engineering calculations for the on-site drainage:

1. The total tributary drainage areas entering the improved area.
2. Times of concentration, intensity, and runoff coefficients used for determining runoff.
3. Discharge volume in cubic feet per second, velocity, and additional data needed to establish that the drainage system will convey the flow to the approved adequate outlet.
4. The plan and profile of all drainage conduits to where the system discharges into the adequate outlet.
5. Size and type of all drainage improvements including all drainage structures.
6. Sufficient contours and grading details to show that the proposed improvements will function adequately.
7. All approved permits; including; but not limited to, NPDES, Right of Way, and any needed legal easements.

All drainage construction plans shall be sealed with the stamp of a professional engineer registered in the State as required by Ohio R. C. Chapter 4733. The drainage plan shall be approved by the Seneca County Engineer prior to the construction of any portion of the drainage system.

E. Culverts. All drainage conduits with a clear span of less than ten (10) feet shall be considered a culvert. All structures with a clear span over ten (10) feet, shall be considered a bridge (see section 205). Culverts shall be used to convey water through a roadway embankment and shall be designed so as not to impose a hazard to the roadway or the surrounding area. Attention shall be given to alignment, grade, and sizing so hazards shall not exist. Each culvert shall be

assigned an I.D. number by the County Engineer's office and all design work shall be associated with said I.D. The design system shall be reviewed and approved by the Seneca County Engineer.

1. All culverts shall be installed, bedded and backfilled in accordance with the current Ohio Department of Transportation (O.D.O.T.), Construction and Materials Specifications.
2. All conduit shall be reinforced concrete unless otherwise approved by future maintenance authority.
3. Headwalls and endwalls shall be installed when required by ODOT design standards.
4. Any special treatment, including catch basins, improved inlets, headwalls, stilling basins, energy dissipators, downstream channel improvements and erosion control shall be taken into consideration by the design engineer.
5. All culverts draining areas larger than 200 acres shall be designated as major culverts and shall be designed to convey a twenty-five year frequency storm.
6. All culverts draining areas 200 acres or less shall be designated as minor culverts and shall be designed to convey a ten year frequency storm.
7. Approved NPDES Permit and submission shall be sent to the Seneca County Engineer.

F. Subsurface drainage.

1. For roadway structures and slope stabilization, pipe underdrains are to be used as required by the geotechnical report.
2. In the design of the pipe underdrain system, consideration shall be given to the type of pipe used, the filter material, and the surrounding soils that are to be drained in order to avoid clogging and achieve adequate hydraulic capacity.
3. The design and construction of all subsurface drainage systems shall be reviewed and approved by the Seneca County Engineer.

G. Downspout drain lines.

1. Downspout drain lines may be installed into the storm sewer drainage system. The downspout drain lines should empty into the nearest catch basin or manhole to prevent excessive pipe sizes for the downspout drain lines. Downspouts may not directly or indirectly outlet onto a public roadway.
2. A six inch pipe shall be the minimum size for any collector line.
3. Roof drains and sump pumps shall be tied into drains back of the curb connected to the storm sewer system, or if impractical where the lot slopes to the rear and a drainage swale, storm sewer, or other outlet method is available, it may be used if approved. All connection into the existing storm sewer shall be inspected and approved by the Seneca County Engineer. Attention shall be made to protect these drains from backflow due to high water in the system.

H. Design frequency; structures.

1. The minimum design frequencies to be considered for drainage structures shall be as follows:

Structures	Frequency (years)
Storm sewers	5; with 10 yr profile below CB lid
Open ditch	10
Culvert(major)	25
Culvert (minor)	10
Curb Gutters	2
Bridges	50
Flood plain structure	100

2. The design frequency to be considered for an individual structure may be altered by the Seneca County Engineer where there is a flood hazard or where the health and safety of the residents of the subdivision would be endangered by inundation of storm water.

I. Open ditches.

1. The minimum slope of open ditches shall be one tenth of one percent (0.1%). All ditches, slopes and other areas disturbed by construction shall be seeded and mulched per NPDES Permit.
2. Ditch linings shall be installed as follows:

Type of Cover	Allowable Velocity (ft/second)
Seeded lining	0-3
Sodded lining	3-5
Lining approved by Seneca County Engineer	Above 5

3. The minimum dimensional requirements for open ditches shall be a four foot bottom width, one and one-half foot depth, with back slopes graded to a four to one slope unless otherwise approved by the Seneca County Engineer, drainage swales that convey surface water specifically for and between lots shall be exempt.
4. All open ditches outside of the normal right-of-way shall be protected with a minimum twenty-five (25) foot drainage easement as required by item section 217-I-C.
5. The easement(s) shall be shown on the final plat and the construction plans and it shall be labeled "Public Drainage Easement," and shall detail who will assume maintenance responsibilities. A letter by said authority;

accepting maintenance responsibility, shall be required for final plat acceptance. [1]

J. Storm sewer design.

1. Where a storm sewer system is to be constructed within a roadway where curbs are installed, catch basins with curb inlets shall be required in accordance with the design specifications and standard drawings of the State of Ohio Department of Transportation, Division of Transportation, Bureau of Location and Design. Reference shall be made to ODOT Standard Drawings for Catch Basin lids.
2. Where a storm sewer system is being constructed and there are no curbs being installed or the storm sewer system is being installed away from the roadway, there shall be a drainage swale over the storm sewer system draining to the inlet basin. All such inlet basins shall be spaced according to these regulations and of the type specified by O.D.O.T.
3. All storm sewers shall be sized to flow approximately full for a five (5) year storm. The hydraulic gradient for a ten (10) year storm shall be kept below the catch basin grates in all cases. This will eliminate storm water being detained on the pavement surface during this period. The design frequency to be used for an individual structure and/or system may be altered by the County Engineer where the health and safety of the residents would be endangered by the hazards of flood waters or increased flows.
4. All storm sewers shall be designed with hydraulic slopes sufficient to give a mean velocity of not less than three feet per second, when flowing full.
5. All catch basins and manholes shall be precast or cast-in-place concrete and shall be constructed in accordance with the design specifications of O.D.O.T.
6. In the case of sewers where velocities exceed fifteen feet per second, special provisions shall be made to protect against erosion and displacement.
7. No storm sewer shall be less than twelve inches in diameter, excluding metering devices, and must be reinforced concrete or approved material accepted by the maintaining authority.
8. Single-family house spouting and footer drain connections shall not be less than four inches in diameter.
9. When storm sewers are increased in size, or when smaller sewers join larger ones, the invert of the larger should be lowered to maintain the same energy gradient, or, by placing the crown of both sewers at the same elevation.

[1] All other drainage easements shall be deemed private, however, maintenance responsibility (individual homeowner, home owners association, etc.) must be spelled out on the construction plans and final plat.

10. Excluding metering devices; in no case shall a larger pipe empty into a smaller one, even though the capacity of the smaller pipe is greater, unless prior approval is given by the Seneca County Engineer.
11. Any existing storm sewer system to be used in a hydraulic design must:
    a. Be approved via hydraulic design and visual inspection by the Seneca County Engineer
    b. Be designed using a 3/8" coefficient for farm tile drainage unless otherwise approved.
    c. Evaluate any surface inlets, roofs and other impervious areas utilizing a 2 year storm runoff.

K. Appurtenances to storm drainage design.
1. Manholes or catch basins shall be installed at all changes of size, grade, and/or alignments.
2. Maximum spacing for manholes and catch basins shall be determined by gutter and catch basin lid design. A maximum of a six (6) foot spread into the roadway will be accepted. [1]
3. The minimum cover for drainage pipes under pavement shall be twelve inches from the bottom of the pavement build-up to the crown of the pipe.
4. The minimum internal diameter of manholes shall be forty-eight inches.
5. All drainage pipes laid under pavement or within three feet of the edge of the pavement shall be bedded, backfilled with granular material and mechanically tamped, per ODOT requirements.
6. All other drainage structures and appurtenances shall comply with applicable County specifications and/or the most current edition of ODOT's Construction and Materials Specifications and Standard Construction Drawings, Appendix A, Figures 13 & 14. Any discrepancy between the two shall be decided by the Seneca County Engineer.

II . STORMWATER: RUNOFF CONTROL

A. Method of determining design runoff values

The following serves as a guide to design engineers to determine the appropriate control method. *"Bulletin 71, Rainfall Frequency Atlas of the Midwest, 1992"* may be used in determining the intensity of all designed rainfall events.

1. Rational Method

The Rational Method may be used for computing the design rate of runoff for tributary areas of less than 200 acres

a. The attached appendix shall serve as a guideline for determining runoff coefficients for use in the rational formula. Unless otherwise proven, all retention/detention pond areas shall have a C value of 1. The weighted C value shall be used in the design calculations.

[1] Generally spacing is 300 feet on center as measured horizontally along the centerline of the pipe

b. For tributary areas over 200 acres and less than 2000 acres, Urban Hydrology for Small Watersheds, Technical Release No. 55, US Department of Agriculture, Natural Resources Conservation Service may be used.

2. USGS Report Method

Where major structures are to be required; the equations provided in *USGS Report 93-135* shall be used in the design of culverts, storm water pump stations, bridges, storm sewers and open channels with urban drainage areas. *USGS Report 93-4080* provides equations for estimating flood volumes, equations for lag times and a dimensionless unit hydrograph for rural drainage basins in Ohio. The equations provided in this report should be used in the design of detention basins and storm water pump stations. *USGS Water Resources Investigations Report 89-4126* for the design of drainage systems with rural drainage areas.

3. Unit Hydrograph Method

For drainage areas greater than 640 acres where considerable difference in the runoff characteristics is typical and where conduit or channel storage may deserve special attention, the dimensionless hydrograph method should be used to provide a better model of actual condition. The NRCS, Section 4, Hydrology, National Engineering Handbook, Chapter 16, amply describes the methodology of dimensionless unit hydrographs.

Purpose. This criteria shall serve as the minimum requirements for control of stormwater runoff leaving developments. These regulations require controlling of the discharge rate of runoff prior to its release to off-site land.

B. Detention\Retention Basin Design:

1. Dry basins shall have low flow protection in the form of a low flow channel. This channel will extend from the initial point of entry of each inlet to the flow line of the discharge point.
2. Dry basins with bottom widths greater than forty (40) feet shall have subsurface drainage at no more than 20 foot spacing to dry the basin after storm water discharge. If elevations do not permit the use of subsurface drainage, the engineer shall show such in the design calculations.
3. Basins in proposed residential areas should be aesthetically pleasing. The Regional Planning Commission may require, during the preliminary plat approval that special provisions be made to maintain these basins as such.
4. Wet basins in areas where public water is not available shall have a dry hydrant, which is accessible from a public road installed. Special provisions shall be made during the preliminary approval.
5. Design shall show impact of water surface on storm events up to and including the 100 year storm.
6. The number of basins shall not exceed two (2) unless otherwise approved by the maintaining authority and shall be on lands owned (owned or have right of access by easements) by the maintaining authority.
7. Basins shall have a 6-10 foot ledge around the perimeter at the normal water surface elevation.

8. Where a basin functions both as flood and sediment control; the design will be evaluated through *"Sediment Basins, Using Modified stormwater management basins and sediment basins to reduce water pollution from construction sites in Ohio" from the Department of Geology, Kent State University, Ohio.* (Copy is available in the County Engineer's office)

C. Design Storm Determination

1. The peak rate of runoff from an area after development shall not exceed the peak rate of runoff from the same area before development for all storms from a two year to a 100 year frequency.
2. Determine the total volume of runoff from a two year frequency storm occurring on the area before and after development. Time of concentration (Tc) shall be determined by the engineer and documentation shall be submitted with the design calculations.
   a. Using the percent increase in volume of runoff due to development, pick the critical storm from the following table:

The percentage of increase in volume of runoff is (Qpost/Qpre)*100% =		The critical storm for discharge limitation shall be:
Equal to or Greater Than	But, Less Than	
0	20	2 year
20	50	5 year
50	100	10 year
100	250	25 year
250	500	50 year
500	--	100 year

   b. The peak rate of runoff from the critical storm and all more frequent storms occurring on the development area shall not exceed the peak rate of runoff from a two year frequency storm occurring on the same area under predevelopment conditions. Storms of less frequent occurrence than the critical storm of the 100 year storm shall have peak runoff rates equal to or less than predevelopment runoff rates for all storm events.
   c. Retention/detention storage volumes shall be calculated by Natural Resources Conservation Service (NRCS)TR-55, TR20, or other approved methods.
3. Retention/detention storage outlet pipes shall be designed for discharge based on the run-offs as calculated in paragraph (2) hereof.
4. Storage volume does not have to be provided for runoff from off-site upstream areas. Upstream runoff waters may be conveyed through the site in accordance with the current conditions. A designer may however

utilize upstream runoff control to balance land utilization if approved by the Seneca County Engineer during preliminary design.

D. Final stormwater runoff control plan. A final stormwater runoff control plan shall be submitted to the Seneca County Engineer for final approval. The final plan shall be developed in accordance with currently accepted policy and criteria. The final plan shall include all the engineering data required in Section 217 hereof, and shall also include:

1. The predevelopment rate of runoff and intensity for the various rainfall frequencies used in the analysis.
2. The hydrologic data of the tributary area, including time of concentration, intensity and runoff coefficients.
3. The location of the proposed detention facility in relation to the tributary area.
4. The inflow hydrographs for the tributary area prior to development for the various rainfall frequencies used in the analysis outlined in these regulations.
5. The critical storm hydrograph based on the criteria outlined in these regulations.
6. The storm hydrographs of the less frequent occurrences to check peak runoff rates.
7. The maximum permissible release rate from the detention facility (i.e., outflow hydrograph), including rating curves for all outlet structures up to and including the 100 year storm.
8. The storage volume required for the detention facility.
9. The design of a facility for release of stored water and for bypassing excess flows of exceedingly rare rainfalls that cannot be accommodated by the storage facility (ie. Emergency spillways).
10. The design for complete and timely drainage of stored runoff by sufficient basin slope and/or alternate release mechanisms without causing secondary problems.
11. Type of detention facility (parking lot, basin, etc.).
12. Safety precautions.
13. Approved NPDES permit and copy of submission to OEPA

E. Maintenance. The Seneca County Ditch Maintenance Department shall assume responsibility for permanent maintenance of the facilities designed to control stormwater runoff not on a public ROW. Major structures shall consist of but not be limited to storm sewer lines, catch basins, and manholes. Maintenance of minor structures, above ground retention/detention structures, ditches and all other open water courses, shall be the responsibility of an authority as assigned in Section A-I-5. Special covenants shall be written into the title of individual lots so the homeowners are aware that portions of their property shall be used for temporary water storage (if applicable), and copies of covenants included with the final plat.

F. Right of entry. Ownership and/or easements for the purpose of maintenance shall be granted to the maintaining authority for access to all stormwater control structures and facilities for which the maintaining authority is assuming permanent maintenance responsibility. Such easements shall be noted on the construction drainage and final plat.

G. Parking Area. When utilizing a parking area for detention facilities, the depth of water retained shall not exceed 6", unless otherwise approved by the County Engineer.

III. STORMWATER: EROSION AND SEDIMENTATION CONTROL

A. Purpose. The following procedures have been specified to help minimize erosion and sedimentation problems encountered during the development process, and comply with EPA, NPDES requirements. Meeting the following standards and criteria does not relieve any person or firm from liability for erosion or sediment damage to another person's property.

B. Review procedures.

1. All subdivisions shall be reviewed by the appropriate agency to see if control measures are needed to minimize water, erosion and/or sediment problems.
2. An erosion and sedimentation control plan shall be submitted for all subdivisions containing more than ten lots, the construction of a street, or as required by NPDES regulations. Approved NPDES permit and copy of submission to OEPA shall be submitted.
3. Subdivisions; which are a portion or phase of a larger proposed allotment, shall submit a tentative erosion and sediment control plan for the entire allotment.
4. NPDES Permits will locally be evaluated through *"Rainwater and Land Development, Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection; Second Edition 1996."*

C. General guidelines.

1. When originating upgrade, runoff shall be intercepted or diverted away from the construction site so as to minimize the amount of flow over the construction site.
2. Sediment basins, debris or desilting basins, silt fences, and/or silt traps, shall be inspected by the NPDES authority and certified to the Seneca County Engineer as installed per NPDES Permit within seven (7) days of the installation.
3. Terraces, diversions and/or grassed waterways should be installed and maintained as part of the water disposal system to further control water and sediment damage.
4. Permanent vegetation, including the use of sod, and structures should be installed and maintained as soon as possible to help control water and sediment damage.

5. Erosion control is to be installed prior to completion of construction. When work is being done during slow growing or dormant seasons, alternate and/or temporary solutions shall be effected.

218 SANITARY SEWER IMPROVEMENTS AND SEWAGE DISPOSAL

A. The feasibility of providing sanitary sewers connected to an existing publicly owned treatment works (POTW) shall be the first consideration. Where, in the determination of the Ohio Environmental Protection Agency, an adequate existing central wastewater treatment system is in close proximity, a sewerage system shall be installed to serve all lots of the subdivision. A "sewerage system" means pipe lines or conduits, pumping stations and force mains, and all other construction, devices, appurtenances and facilities used for collecting or conducting water-borne sewage, or other wastes to a point of disposal or treatment. The Seneca County Sewer District shall review and approve all proposals and plans.

B. Where a publicly owned treatment works (POTW) is not, in the determination of the Ohio Environmental Protection Agency, in close proximity, a central sewerage system or semi-public disposal system shall be provided for the subdivision by the developer. The design and specifications for the central sewerage system or semi-public sewage treatment plant are under the authority of the Ohio Environmental Protection Agency by virtue of Ohio Revised Code Section 6111.44. The Seneca County Sewer District shall review and approve all proposals and plans.

C. Where the installation of a central sewerage system or semi-public disposal system has been deemed impracticable and inadvisable by the Ohio Environmental Protection Agency and the Seneca County General Health District, household sewage disposal systems which meet the provisions of Ohio Administrative Code Chapter 3701-29, as administered by the Seneca County General Health District, may be considered.

D. When connecting to a POTW or a central sewerage system, the Seneca County Sewer District will set the rate structure and provide future maintenance for the public sections of the system.

219 WATER SUPPLY IMPROVEMENTS

A. Where the subdivision is to be served by an extension of the distribution facilities of a public water system, such construction shall be in accordance with Ohio Revised Code Chapter 6109 and Ohio Administrative Code Chapter 3745-91 as administered by the Ohio Environmental Protection Agency.

B. In areas where a public water system is not available, private water systems which meet the requirements of Ohio Administrative Code Chapter 3701-28, as administered by the Seneca County General Health District, may be considered.

220 DRIVEWAY AND SPECIAL APPROACHES

The efficiency and safety of a street largely depends on the amount and character of roadside interference with the movement of traffic. Vehicles entering, leaving or standing nearby cause most of the roadside interference. The major roadside interference originates in vehicle movement to and from businesses, residences and other development along the street. Accordingly, regulations and overall control of driveway connections are necessary to provide efficient and safe operations of the street systems.

For standard driveway details see Appendix A, Figures 15 & 16.

When new roads are being built, all sublot drive pipe sizes shall be predetermined and submitted to the County Engineer for approval with the required construction drawings.

New home construction may be possible in a subdivision before the street improvements are given final approval by the County. Therefore, until the improvement is accepted by the County, the developer shall be responsible for seeing that the appropriate permit is obtained before installation of any drive pipe. All drive pipes shall be installed to meet County standards including location, size, length, type, elevation and grade. The developer shall be responsible for replacement of any drive pipes installed which do not meet County standards, and he shall also be responsible for any damage which may occur to any drive pipe after it has been installed until the end of the maintenance guarantee.

221 ON-SITE, OFF-SITE AND OVER-SIZED IMPROVEMENTS

A. On-Site Improvements

The subdivider shall be required to construct streets and utilities to his subdivision boundary.

B. Off-Site Improvements

When streets or utilities are not available at the boundary of the proposed subdivision, the subdivider shall be required, prior to the approval of the final plan to:

1. Obtain, in the developer's name, for future assignment to Seneca County, the rights-of-way to construct the necessary streets or utilities.
2. Make such arrangements as are necessary to financially guarantee the construction of the streets and/or utilities.

C. Over-Sized Improvements

"Over-sized" improvements are streets or utilities of a larger size than would be necessary for the proposed subdivision.

222 COST OF ON-SITE, OFF-SITE AND OVER-SIZED IMPROVEMENTS

A. Cost of On-Site Improvements

The developer shall be responsible for the cost of all on-site improvements, and they shall be installed in such a location and manner as to make their extension suitable for servicing adjacent areas.

B. Cost of Off-Site Improvements

If the Board of County Commissioners, in conjunction with the agency or agencies having control of the improvements, finds that off-site extensions require crossing undeveloped lands and that a special assessment would not be warranted against such lands until such future time, or if the Board of County Commissioners determines that a governmental expenditure for such purpose is not warranted until such future time, but that the off-site improvement is necessitated by the requested development, then the developer shall be responsible for the cost of these improvements.

C. Cost of Over-Sized Improvements

If the Board of County Commissioners, in conjunction with the agency or agencies having control of the improvement, believe said improvement would be beneficial for future planned development, then the Board shall consider special assessment, governmental expenditure or an alternate means of financing to provide for the over-sizing.

223 SPECIFICATIONS

Where specifications are not specifically stated within this text, those of the Ohio Department of Transportation will be used unless others are approved by the County Engineer.

Specifications within this text and those of ODOT are not intended to replace those prepared by the developer's engineer, but rather they are to augment them. Specifications of the County and ODOT will be treated on their own merit.

224 CONSTRUCTION PROCEDURES AND INSPECTION

All construction procedures and inspection shall follow the rules and regulations of the agencies having the jurisdiction over that phase of the improvement.

225 START OF CONSTRUCTION

Before the start of any construction of subdivision improvements is made, the developer must first have a set of construction plans approved by the County Engineer and have made all necessary arrangements for County inspections of said improvement.

226 FINAL INSPECTION

Upon completion of all the improvements, as required, the subdivider shall request, in writing, a final inspection by the County Engineer as required under Section 711.091 of the Ohio Revised Code. The County Engineer shall make said final inspection of all the required improvements with the assistance from other agencies having authority pertaining to specified items and send notice of said inspection to the Township Trustees of the township where the improvements are located.

ARTICLE 3
PAVEMENT DESIGN

300 PURPOSE

This article has been prepared to specify the pavement design criteria to be used in determining minimum thickness of street pavement. In the case of any questions as to street classification or thickness required, the County Engineer shall make the final determination.

301 PAVEMENT TYPE AND DEPTH

The type and depth of pavement for new street construction shall be based on the classification of the street and soil types within the construction area as shown on Table 300/1.

302 PAVEMENT SPECIFICATIONS

All pavement materials shall conform with the current State of Ohio Department of Transportation Construction and Material Specifications unless other requirements are determined to be needed by the County Engineer for the subject project.

303 SUB-BASE DRAINAGE

Aggregate drains and shallow pipe underdrains shall be used and constructed to drain the subbase of all new pavement. The type and location of said subbase drainage items shall be determined by the County Engineer during the plan development stages. See Appendix A, Figure 16, for construction details of subbase drainage items. When pipe underdrains are required, a 3" aggregate base course filter fabric shall be provided.

304 SUB-GRADE DRAINAGE

When due to high ground water conditions it becomes necessary to drain excess water from the subgrade materials, deep pipe underdrains shall be required. The type and location of said subgrade drainage items shall be determined by the County Engineer. When pipe underdrains are required, a 3" aggregate base course with filter fabric barrier shall be provided. See Appendix A, Figure 16.

TABLE 300/1
PAVEMENT TYPE AND DEPTH

Street Classification	Pavement Type	Full Depth Asphalt	Composite Stone/ Asphalt
Residential	Stone (#2 & #304 mix)	0"	8"
	Asphalt 301 (302)	6"	0"
	402 (448, T2, PG 64-22)	2"	2"
	404 (448, T1, PG 64-22)	1.5"	1.5"
Thoroughfares	Stone (#2 & #304 mix)	0"	12"
	Asphalt 301 (302)	8"	2"
	402 (448, T2, PG 64-22)	2.5"	1.5"
	404 (448, T1, PG 64-22)	1.5"	1.5"

Industrial	Stone (#2 & #304 mix) Asphalt 301 (302) 402 (448, T2, PG 70-22) 404 (448, T1, PG 70-22)	0" 11" 2.5" 1.5"	14" 2" 1.5" 1.5"

NOTES:
1. The final surface coarse of asphalt material shall be made using limestone aggregate.
2. Asphalt roads shall be constructed in phases with Phase I being 80% of pavement depth and Phase II being 20% of depth placed in the following paving season.
3. The developer's professional engineer may submit a pavement design for approval in lieu of the above.

ARTICLE 4
GUARANTEES AND INSURANCE

400 PURPOSE

This article describes the guarantees and insurance required during construction and the 24-month maintenance period after final approval of all the improvements. All guarantees and insurance required under the section shall be made with and approved by the Board of Seneca County Commissioners

401 LIABILITY INSURANCE

The subdivider and/or contractor(s) shall carry such insurance as is deemed necessary by the County Commissioners and the County Prosecutor to indemnify and save harmless the County from any and all liability arising from conditions which may arise or grow out of the construction or installation of required improvements. This insurance shall be in effect during the construction period and the 24-month maintenance period. A copy of said insurance policy shall remain with the Clerk of the County Commissioners and the County Engineer at all times. The policy shall list the County as an additional insured and the County shall receive notice of any non-renewal or termination.

402 TITLE GUARANTEE

A title guarantee shall be furnished to the Board of County Commissioners prior to acceptance of dedication to guarantee that the title of the lands to be dedicated is free and clear of all encumbrances and clear title stands in the name of the dedicator as indicated on the final plat. A certification that all taxes to the date of transfer are paid or secured to be paid shall also be submitted as part of the title guarantee.

403 CONSTRUCTION GUARANTEE

All improvements required by these Regulations shall be constructed prior to approval of the final plat by the Commission. In lieu of actual installation or completion of the required improvements, the subdivider shall furnish the County Commissioners a construction guarantee insuring completion of all improvements as a consideration for the approval of a final plat by the Commission before all improvements have been made. The guarantee shall be of the types described in Section 405.

A. Amount of Guarantee

The financial guarantee shall be in the amount equal to the developer's approved Professional Engineer's estimate of cost for the completion of all remaining improvements. Said cost estimate shall be based upon ODOT bid prices plus percentage contingency and inflation costs. If the required improvements are not completed within eighteen (18) months, the amount of the guarantee shall be reviewed and may by increased by the County Engineer where it is found that the estimated cost of the remaining improvements are more than the remaining guarantee.

B. Duration of Guarantee

The duration of the guarantee shall be until such time as the improvements are accepted by the County Engineer.

C. Reduction of Guarantee

The County Commissioners may reduce the amount of the financial guarantee herein specified, when any portion of an improvement required by the Regulations has been satisfactorily completed and inspected by the County Engineer. The County Engineer shall certify by a copy of the inspection report to the County Commissioners that said portion of improvement is completed and satisfactory. Such reduction in the financial guarantee shall not exceed 90 percent of the original amount of the guarantee.

D. Final Release of Guarantee

Upon the request of the subdivider, the County Engineer shall make an inspection of the subdivision to check if all improvements have been completed and satisfactorily constructed. If the improvements have been completed, he shall report the acceptance of the improvements to the County Commissioners and the County Commissioners shall release the remaining financial guarantee.

E. Maintenance During Construction

The subdivider shall be responsible for the maintenance of the improvements installed for the term of the construction guarantee.

404 MAINTENANCE GUARANTEE

At the time of the final inspection of the improvements within the subdivision as specified in Section 403 (D), the subdivider shall furnish the County Commissioners a maintenance guarantee for a period of 24 months to insure that the improvements will hold up under actual conditions and to guarantee the maintenance of the improvements. The maintenance shall be of the types described in Section 405.

A. Amount of Guarantee

The maintenance guarantee shall be in the amount of 10 percent of the total construction cost of all public improvements.

B. Items Covered Under Guarantee
During the guarantee period, the subdivider and/or contractor(s) shall be responsible for maintenance of all improvements and shall repair all failures as soon as notified by the County Engineer.

C. Release of Maintenance Guarantee
The County Engineer shall make an inspection of the improvements 24 months after the maintenance guarantee is furnished. The County Engineer shall report his findings to the County Commissioners for their action. The County Commissioners shall release the guarantee at once if the improvements are satisfactory. If the improvements are declared unsatisfactory, the subdivider shall make the repairs or the County Commissioners may use the guarantee to make necessary repairs.

405 ESCROW ACCOUNT AS GUARANTEE
The subdivider may make arrangements to have an amount equal to the Professional Engineer's estimate held in an escrow account in a bank or other reputable institution approved by the County Commissioners. The subdivider shall file with the County Commissioners an agreement between the bank or lending institution, the County Commissioners and the subdivider, whereby the subdivider guarantees the following:

A. That the funds of said escrow account shall be held in trust until released by the County Commissioners and may not be used or pledged by the subdivider as security in any other matter during that period.

B. In case of failure on the part of the subdivider to complete and/or maintain said improvements, the bank shall immediately make the funds in said account available to the County for use in the completion of those improvements.

ARTICLE 5
CONSTRUCTION DRAWINGS

500 GENERAL
All construction drawings shall be prepared in permanent ink on 24"x36" sheets of drafting film, mylar or linen tracing cloth. A title block shall be placed in the lower right corner of each sheet. If more than three sheets are required, then a title sheet shall be used. The professional engineer responsible for the preparation of the construction drawings shall affix his signature, stamp or seal to each sheet.

501 TITLE SHEET
The title sheet shall be page number one and each sheet thereafter shall be numbered consecutively. It shall contain the following information:

1. Location map: This may be at a scale of 1" = 5,280 feet and shall indicate the subdivision location within the County.

2. Typical Section: A typical section shall be located on this sheet or other sheets of the plans to show design elements of the road construction.
3. Approval Block: An area shall be prepared for the signature of both the subdivider and the County Engineer approving the plans.
4. General Notes: A set of general notes covering special situations, not covered under the general specifications, shall be shown on this sheet or other sheets of the plans.
5. General Summary: A table of "Estimated Quantities" which shall include a column for "Item No.," "Description," "Quantity" and "Unit" in that order may be provided on this sheet.

502 TOPOGRAPHIC AND DRAINAGE SHEETS

A topographic map of the subdivision area to a scale of 1" -= 100 feet shall be provided showing the following information:

A. Topographic Details
   1. All elevations shall be to mean sea level datum.
   2. Contours shall be drawn at 2-foot intervals, if slope is less than 10 percent and 5-foot intervals if the slope is greater than 10 percent.

B. Drainage Details:
   1. The drainage area for each pipe or drainage structure shall be outlined and the number of acres shown on this sheet. To show the entire drainage area, an additional sheet may be required. If this additional sheet is needed, existing aerial mapping or the United States Geological Survey mapping will be sufficient.
   2. The proposed storm drainage system shall be completely shown on this sheet.

503 SPECIAL CONSTRUCTION DRAWINGS

This sheet shall contain detailed drawings of special construction items not otherwise shown.

504 ROAD PLAN AND PROFILE SHEETS

All roads within the subdivision shall be shown on a standard plan and profile sheet. Plan view on top one-half and profile view on bottom one-half.

A. Normal Scale
   1. Use 1" = 50 feet for the horizontal scale and 1" = 5 feet for vertical scale on rural density subdivisions.
   2. Use 1" = 30 feet for the horizontal scale and 1" = 5 feet for the vertical scale on suburban or urban density subdivision.

B. Plan Items
   1. Road centerline, stationing, right-of-way lines, curve data, road numbers, sublot lines, easements and lot numbers.

2. Pavement, curbs, gutters, storm and sanitary sewer structures, bridges, culverts, guardrail and proposed and existing utilities.
3. Topographic features within the general area and any obstruction within the right-of-way or construction area.

C. Profile Items
1. Centerline stationing, benchmarks with the description and elevation, original ground profile grade on the centerline, proposed profile grade.
2. Vertical curve data and sight distance data.
3. Storm structures, sanitary sewer structures, bridges with assigned numbers, culverts with assigned numbers and proposed and existing utilities. County Engineer's Office will assign said I.D. numbers for storm, sanitary, bridges and culverts.

505 CROSS-SECTION SHEETS

A. Scale
Both horizontal and vertical scales shall be 1" = 5 feet, unless approved otherwise by the County Engineer.

B. Location
A cross-section should be shown at each 100' station and other needed locations and shall show the existing ground line dashed, with the proposed section drawn solid.

C. Data
Including following: the proposed finished grade elevation at centerline, the station and the existing elevation at the centerline.

D. Drainage Sections
If a detail culvert sheet is not used, then a cross-section at any proposed culvert or other structure shall be shown. This detail shall include the elevation at both the inlet and outlet. Also, the type and size of structure shall be shown.

E. Earthwork Table
At the right-hand side of each cross-section sheet there should be a column for end areas in square feet and volumes in cubic yards for both cut and fill. Each sheet should have a summation of volumes at the bottom.

506 DRAINAGE STRUCTURES

Detail drawings of all bridges and other drainage structures (other than standard culvert pipe without headwalls) shall be provided.

507 AS BUILT PLANS

After construction is complete the developer shall furnish three (3) As Built Plans to the County Engineer showing all changes in red. The Professional Surveyor and Professional Engineer shall sign the As Builts.

ARTICLE 6
DEFINITIONS

Interpretation of Terms or Works: For the purpose of these Regulations, certain terms or words used herein shall be interpreted as follows:

A. The word "person" includes a firm, association, organization, partnership, trust, company or corporation as well as individual.

B. The present tense includes the future tense, the singular number includes the plural, and the plural number includes the singular.

C. The word "shall" is a mandatory requirement, the word "may" is a permissive requirement, and the word "should" is a preferred requirement.

D. The words "used" or "occupied" include the words "intended, designed or arranged to be used or occupied."

E. The word "lot" includes the words "plot" or "parcel."

F. The definition for any term used herein but not defined herein shall be as contained in Webster's Collegiate Dictionary.

Average Daily Traffic:	The total number of vehicles passing a point during a typical 24-hour day.
A.D.T.:	See Average Daily Traffic
Commissioners:	The Board of County Commissioners of Seneca County
Construction Plan:	The maps and drawings showing the specific location and design of improvements to be installed in the subdivision.
Developer:	Any individual, subdivider, firm, association, syndicate, partnership, corporation, trust or any other legal entity commencing proceedings under these Regulations to effect a subdivision of land hereunder for himself or for another.

Household Sewage Disposal System:	Means any sewage disposal or treatment system or part thereof for a single family, two family, or three family dwelling which receives sewage.
Plat:	A map of a tract or parcel of land (Ohio Revised Code 711.001 [A]).
Private Water System:	Means any water system for the provision of water for human consumption, if such system has fewer than fifteen service connections and does not regularly serve an average of at least twenty-five individuals daily at least sixty days out of the year.
Public Utility:	Any person, firm or corporation, governmental agency or board having a public utility commission permit to furnish to the public, under regulations, electricity, gas, sewer, water, telephone, transportation, steam or other similar public services.
Public Water System:	Means any water system for the provision to the public of piped water for human consumption, if such a system has at least fifteen service connections or regularly serves an average of twenty-five individuals daily at least sixty days out of the year, unless the system meets all the following conditions: (1) Consists only of distribution and storage facilities and does not have any collection and/or treatment facilities; (2) Obtains all its water from but is not owned or operated by a public water system; (3) Does not sell water to any person; and (4) Is not a carrier which conveys passengers in interstate commerce.
Right-of-Way:	A strip of land taken or dedicated for public use. In addition to the roadway, it normally incorporates the curbs, lawn strips, sidewalks, lighting and drainage facilities and may include special features (required by the topography or treatment) such as

grade separations, landscaped areas, viaducts and bridges.

Sanitary Sewerage System: Means any public or community sewerage collection system conveying sewage to a central sewage treatment plant.

Sidewalk: That portion of the road right-of-way outside the vehicular roadway, which is improved for the use of pedestrian traffic (See "Walkway").

Street, Thoroughfare or Road: The full width between property lines or between the lines forming the boundaries of an easement bounding every public way of whatever nature, with a part thereof to be used for vehicular traffic and further described as follows:

1. Public Street: A right-of-way, dedicated to public use, which provides vehicular and pedestrian access to adjacent properties.
2. Private Street: A right-of-way which provides a vehicular and pedestrian access to residential, commercial or industrial structures or groups of structures and which will not be dedicated.

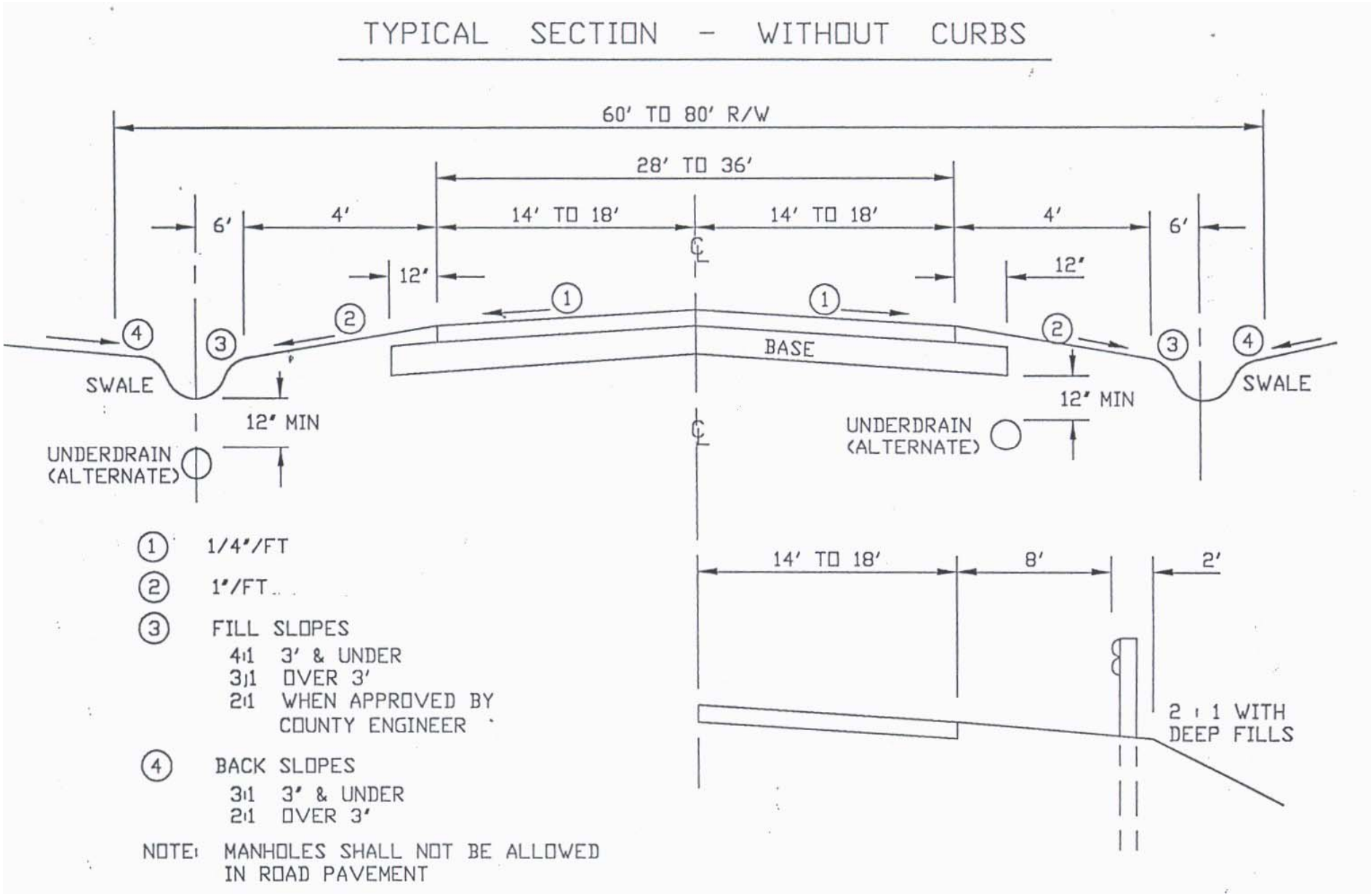
Subdivider: (See Developer)

Surveyor: A person registered to practice surveying in the State of Ohio, by the State Board of Registration.

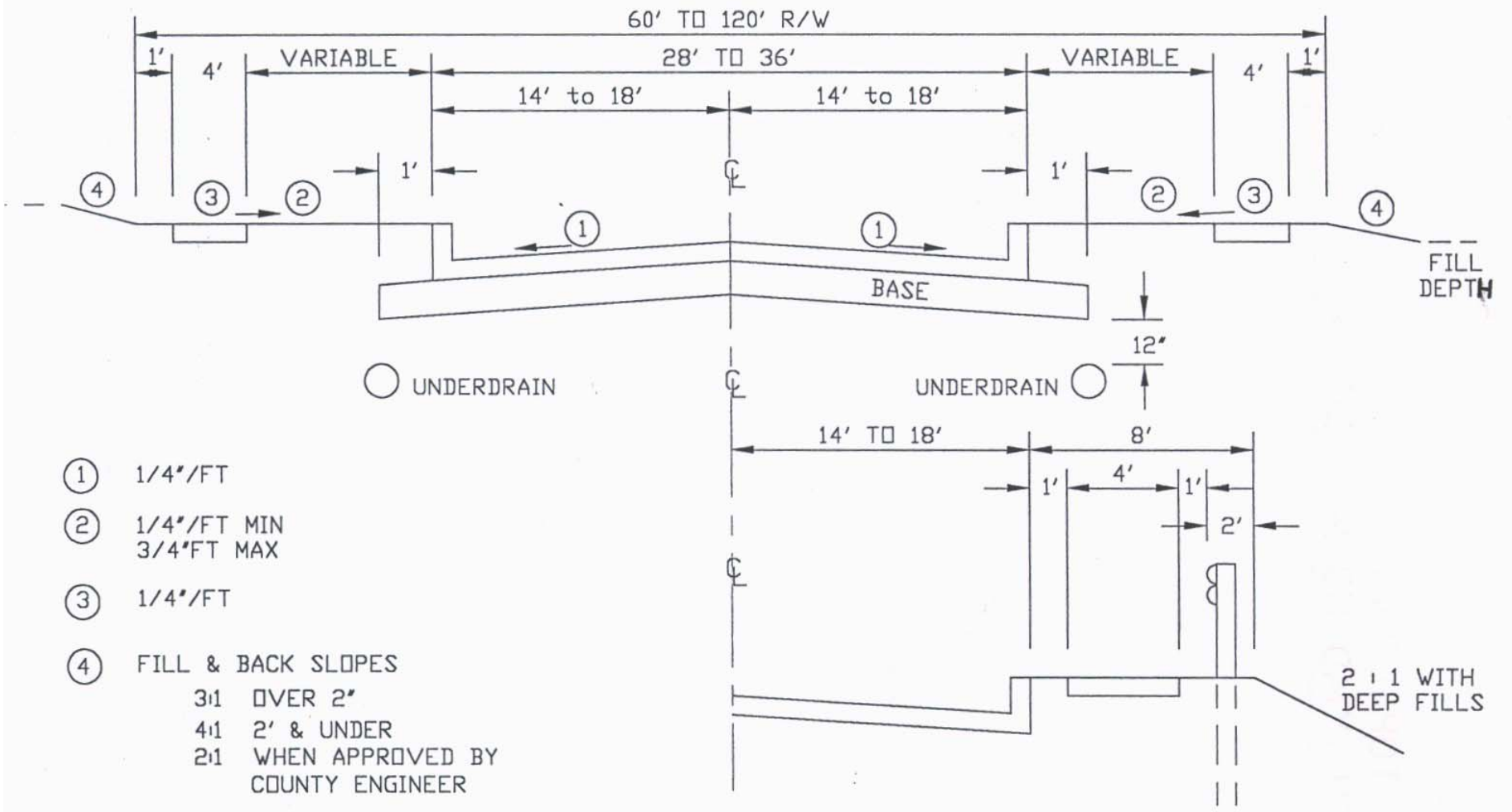
Walkway: A public way, for pedestrian use only, whether along the side of a road or not.

APPENDIX A

STANDARD DRAWINGS
FOR
SUBDIVISION CONSTRUCTION


TYPICAL SECTION - WITHOUT CURBS
60' TO 80' R/W
28' TO 36'
6'
4'
14' TO 18'
14' TO 18'
4'
6'
12'
12'
BASE
SWALE
SWALE
12" MIN
12" MIN
UNDERDRAIN (ALTERNATE)
UNDERDRAIN (ALTERNATE)
1 1/4"/FT
2 1"/FT
3 FILL SLOPES
4:1 3' & UNDER
3:1 OVER 3'
2:1 WHEN APPROVED BY COUNTY ENGINEER
4 BACK SLOPES
3:1 3' & UNDER
2:1 OVER 3'
NOTE: MANHOLES SHALL NOT BE ALLOWED IN ROAD PAVEMENT
14' TO 18'
8'
2'
2 : 1 WITH DEEP FILLS

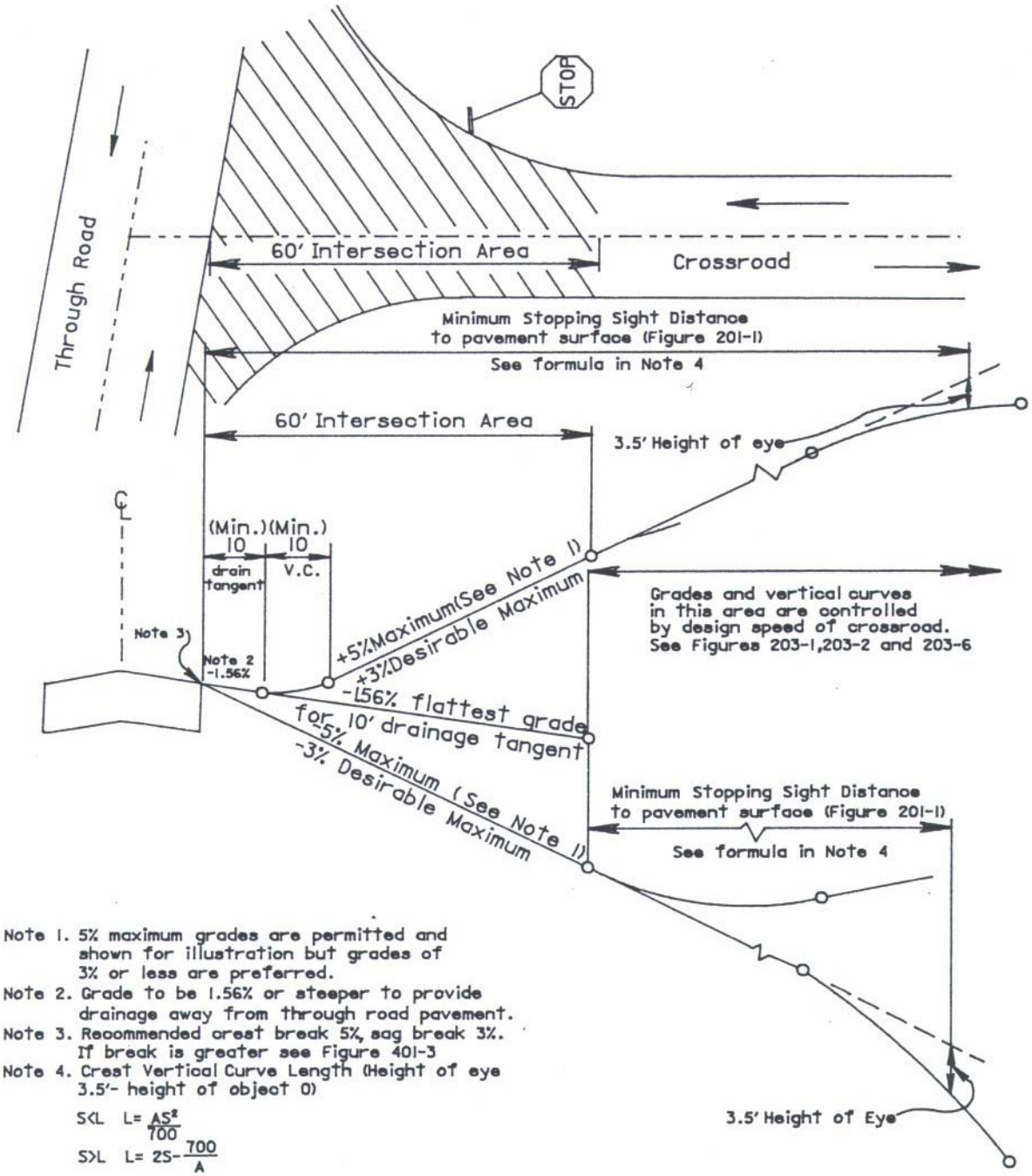
TYPICAL SECTION - WITH CURBS



CROSSROAD PROFILE -STOP CONDITION- THROUGH ROAD NORMAL CROWN

401-2

REFERENCE SECTION 401.41-.44



Note 1. 5% maximum grades are permitted and shown for illustration but grades of 3% or less are preferred.
Note 2. Grade to be 1.56% or steeper to provide drainage away from through road pavement.
Note 3. Recommended crest break 5%, sag break 3%. If break is greater see Figure 401-3
Note 4. Crest Vertical Curve Length (Height of eye 3.5'- height of object 0)

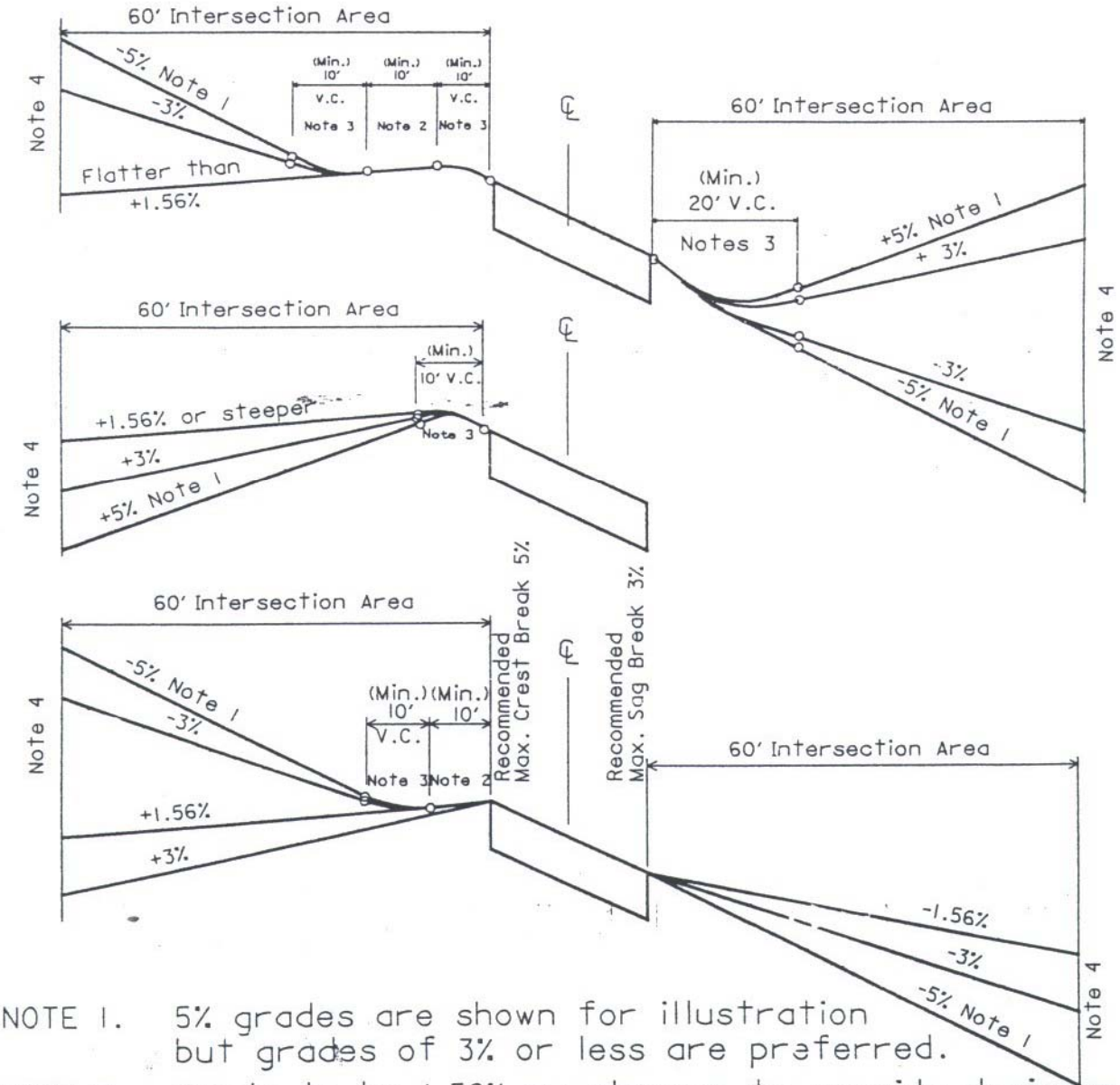
$S<L \quad L = \frac{AS^2}{700}$

$S>L \quad L = 2S - \frac{700}{A}$

CROSSROAD PROFILE
STOP CONDITION
THROUGH ROAD SUPERELEVATED

401-3

REFERENCE SECTION
401.43



NOTE 1. 5% grades are shown for illustration but grades of 3% or less are preferred.

NOTE 2. Grade to be 1.56% or steeper to provide drainage.

NOTE 3. Crest breaks exceeding 5% shall be rounded using vertical curves having a K of 1 or greater.
Sag breaks exceeding 3% shall be rounded using vertical curves having a K of 1.5 or greater

NOTE 4. For grade treatment of this area, see Figure 401-2.

TYPICAL INTERSECTION SIGHT DISTANCE CONDITIONS

201-4

REFERENCE SECTION 201.31-.33

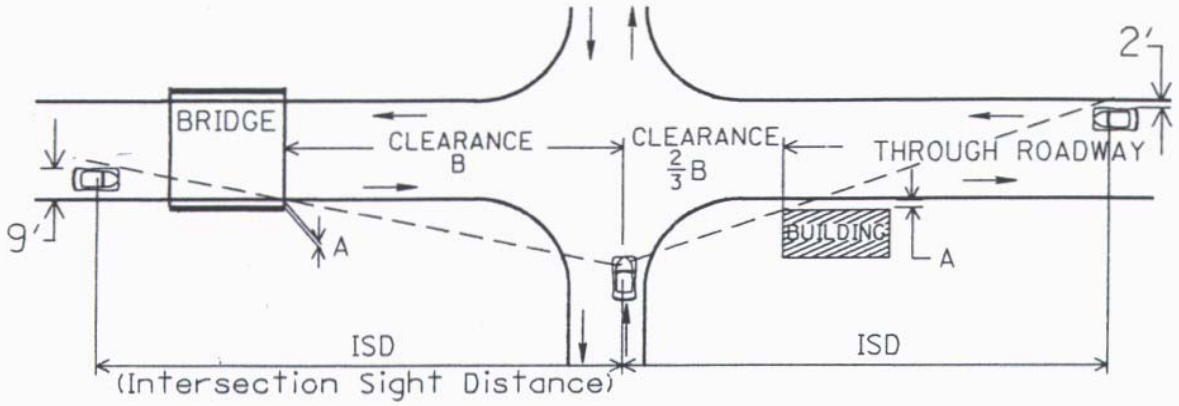


DIAGRAM A - HORIZONTAL COMPONENTS (Sec.201.32)
A = offset from edge of pavement to obstruction

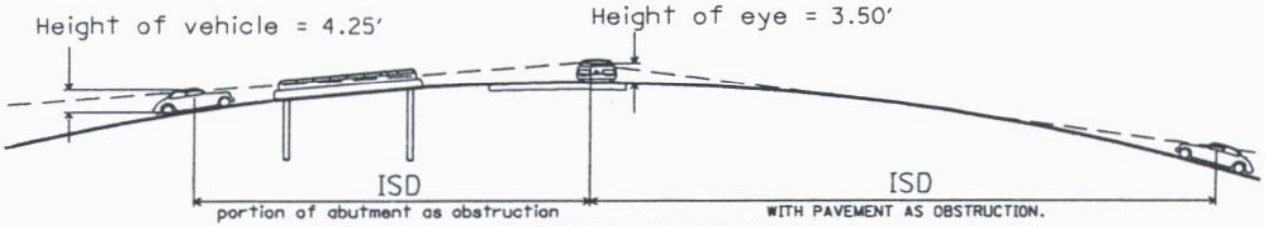


DIAGRAM B - VERTICAL COMPONENTS (Sec. 201.31)

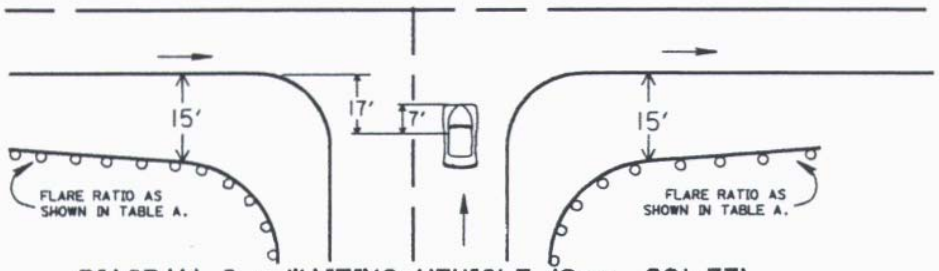
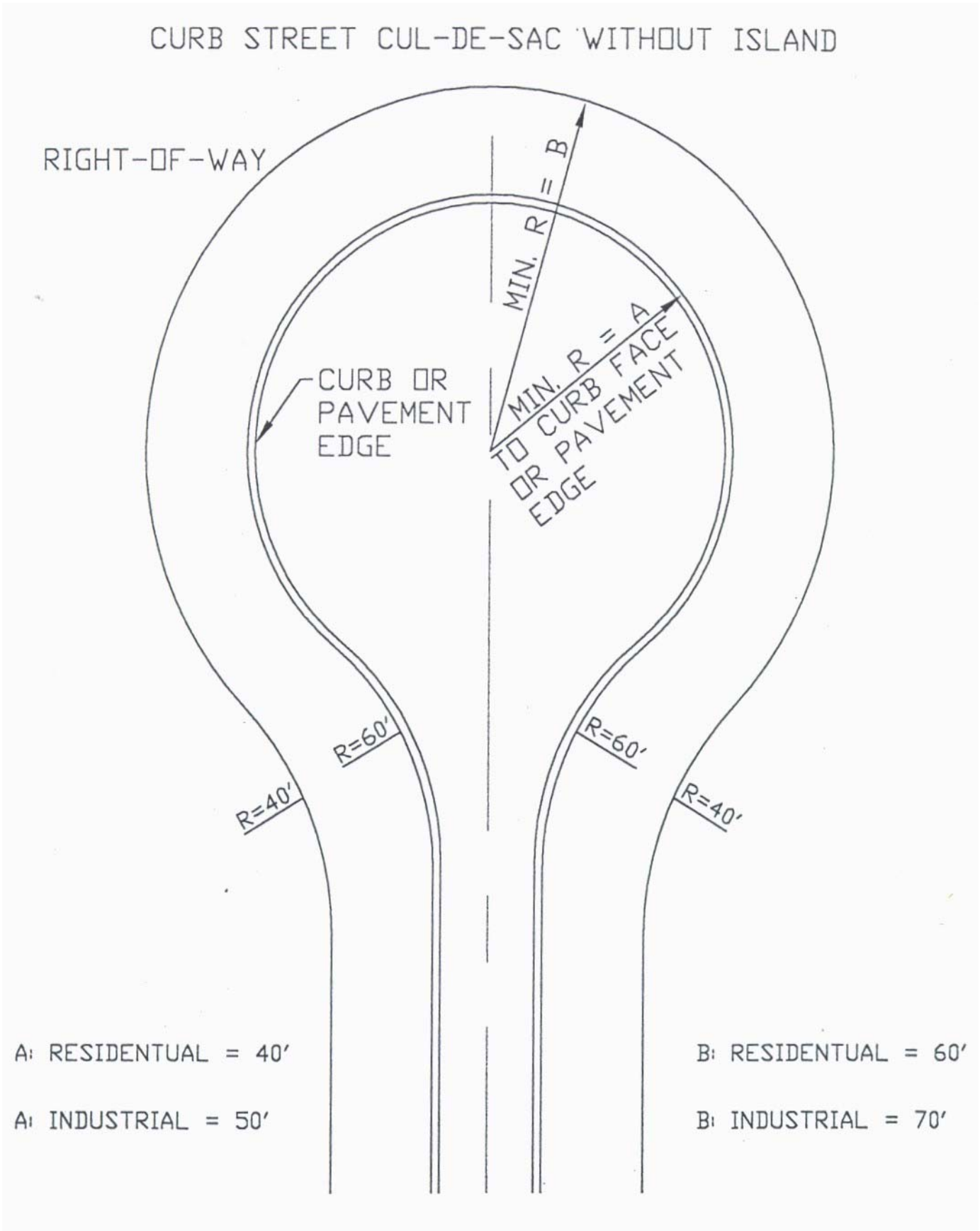
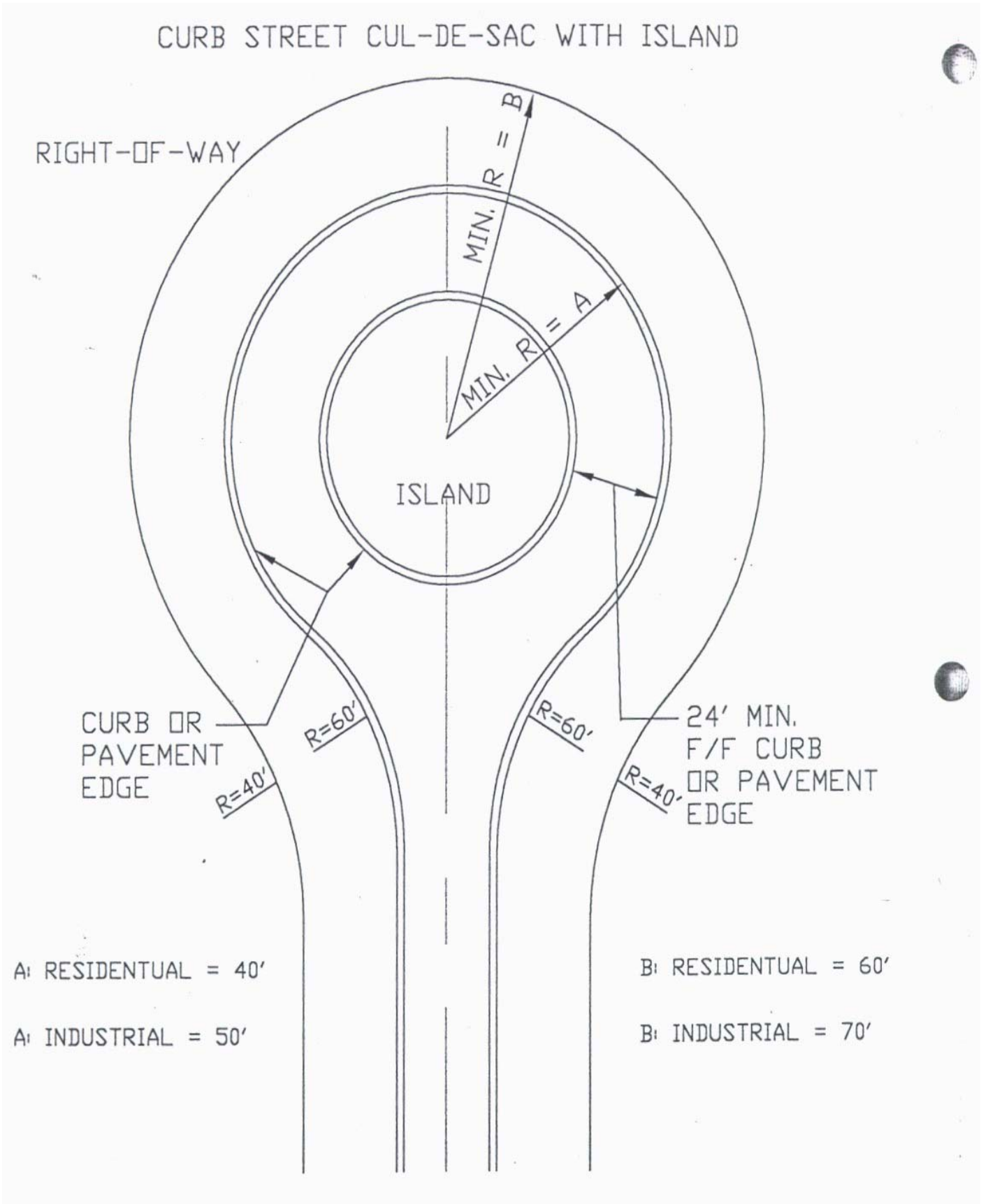


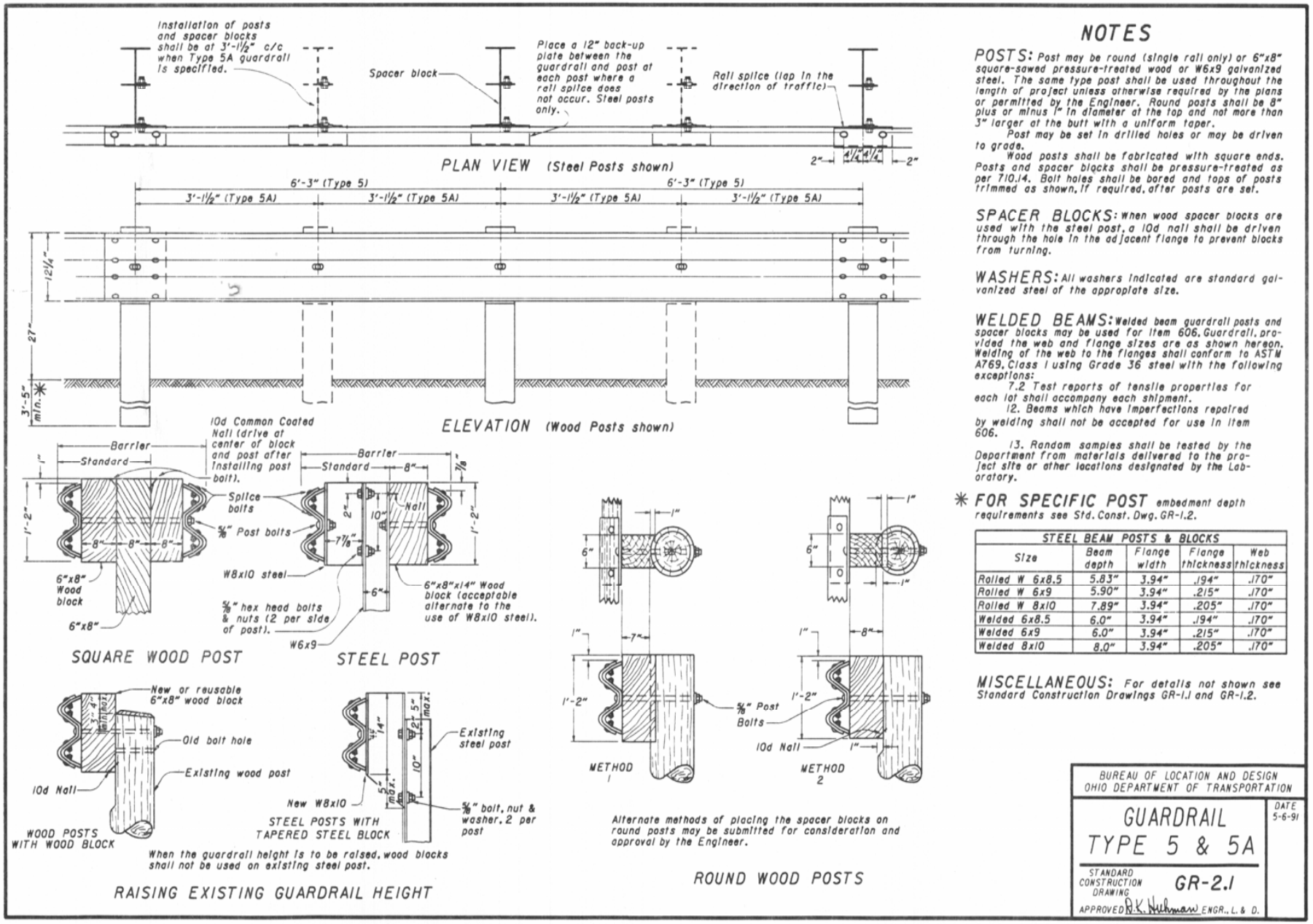
DIAGRAM C - WAITING VEHICLE (Sec. 201.33)

TABLE A

DESIGN SPEED	ISD	CLEARANCE B (Obstruction to vehicle) Offset A =						G.R. FLARE RATIO
		2′	4′	6′	8′	10′	12′	
70	950′	550′	475′	400′	330′	255′	185′	45:1
65	875′	510′	445′	375′	305′	240′	170′	45:1
60	825′	475′	415′	350′	285′	225′	160′	40:1
55	750′	440′	380′	320′	260′	205′	145′	40:1
50	700′	405′	350′	295′	240′	190′	135′	35:1
40	575′	330′	290′	245′	200′	155′	110′	30:1
30	450′	260′	225′	190′	155′	120′	85′	25:1


CURB STREET CUL-DE-SAC WITHOUT ISLAND
RIGHT-OF-WAY
MIN. R = B
MIN. R = A
TO CURB FACE OR PAVEMENT EDGE
CURB OR PAVEMENT EDGE
R=60'
R=60'
R=40'
R=40'
A: RESIDENTUAL = 40'
A: INDUSTRIAL = 50'
B: RESIDENTUAL = 60'
B: INDUSTRIAL = 70'


CURB STREET CUL-DE-SAC WITH ISLAND
RIGHT-OF-WAY
MIN. R = B
MIN. R = A
ISLAND
CURB OR PAVEMENT EDGE
R=40'
R=60'
R=60'
R=40'
24' MIN. F/F CURB OR PAVEMENT EDGE
A: RESIDENTUAL = 40'
A: INDUSTRIAL = 50'
B: RESIDENTUAL = 60'
B: INDUSTRIAL = 70'



NOTES

POSTS: Post may be round (single rail only) or 6"x8" square-sawed pressure-treated wood or W6x9 galvanized steel. The same type post shall be used throughout the length of project unless otherwise required by the plans or permitted by the Engineer. Round posts shall be 8" plus or minus 1" in diameter at the top and not more than 3" larger at the butt with a uniform taper.

Post may be set in drilled holes or may be driven to grade.

Wood posts shall be fabricated with square ends. Posts and spacer blocks shall be pressure-treated as per 710.14. Bolt holes shall be bored and tops of posts trimmed as shown, if required, after posts are set.

SPACER BLOCKS: When wood spacer blocks are used with the steel post, a 10d nail shall be driven through the hole in the adjacent flange to prevent blocks from turning.

WASHERS: All washers indicated are standard galvanized steel of the appropiate size.

WELDED BEAMS: Welded beam guardrail posts and spacer blocks may be used for Item 606, Guardrail, provided the web and flange sizes are as shown hereon. Welding of the web to the flanges shall conform to ASTM A769, Class I using Grade 36 steel with the following exceptions:

7.2 Test reports of tensile properties for each lot shall accompany each shipment.

12. Beams which have imperfections repaired by welding shall not be accepted for use in Item 606.

13. Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

✳ **FOR SPECIFIC POST** embedment depth requirements see Std. Const. Dwg. GR-1.2.

STEEL BEAM POSTS & BLOCKS

Size	Beam depth	Flange width	Flange thickness	Web thickness
Rolled W 6x8.5	5.83"	3.94"	.194"	.170"
Rolled W 6x9	5.90"	3.94"	.215"	.170"
Rolled W 8x10	7.89"	3.94"	.205"	.170"
Welded 6x8.5	6.0"	3.94"	.194"	.170"
Welded 6x9	6.0"	3.94"	.215"	.170"
Welded 8x10	8.0"	3.94"	.205"	.170"

MISCELLANEOUS: For details not shown see Standard Construction Drawings GR-1.1 and GR-1.2.

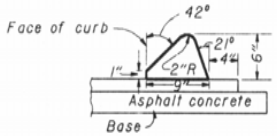
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL TYPE 5 & 5A

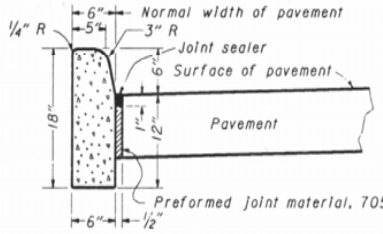
DATE 5-6-91

STANDARD CONSTRUCTION DRAWING GR-2.1

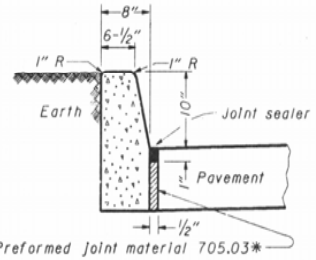
APPROVED R.K. Hickman ENGR., L. & D.



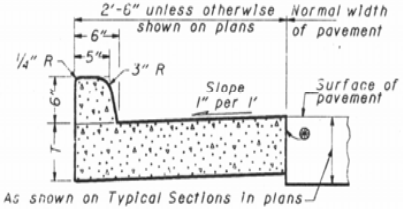
TYPE 1



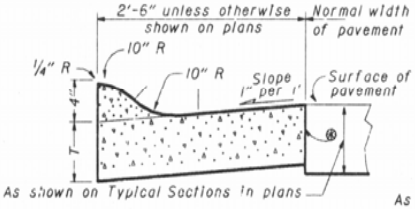
TYPE 6



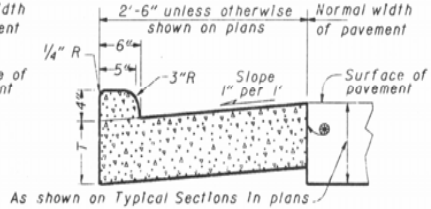
TYPE 7



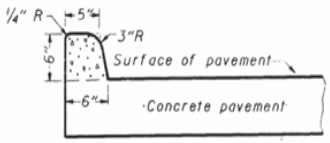
TYPE 2



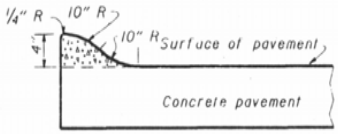
TYPE 3



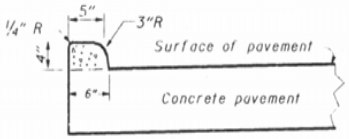
TYPE 4



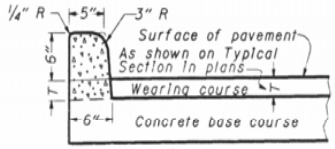
TYPE 2-A



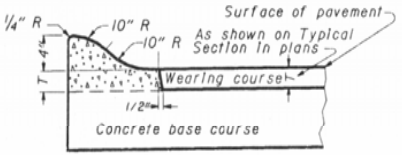
TYPE 3-A



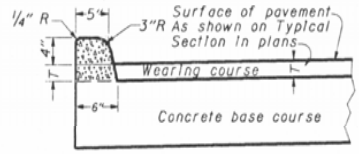
TYPE 4-A



TYPE 2-B



TYPE 3-B



TYPE 4-B

NOTES

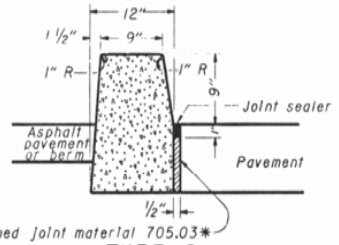
GENERAL: This drawing shows alternate types of curb that may be used on various types of pavement. Typical section of project shows the type to be used, also the thickness of the edge of the pavement or the edge of the curb and gutter section.

JOINTS: One inch expansion joints shall extend up to the top of the curb and shall be constructed in the curb and gutter section in such a manner that the joint seal will extend the full width of the gutter and into the curb face a sufficient distance to seal the joint to an elevation of at least two (2) inches above the flow line of the gutter. Dowel bars shall be used in the curb and gutter section at expansion joints which are identical with the joints in the pavement.
All joints shall be constructed perpendicular to the edge of the curb and to the surface of the pavement.
Transverse expansion joint material shall meet the requirements of 705.03.

GUTTER PLATE THICKNESS: Thickness of gutter plate "T" shall be 9 inches unless otherwise shown on the plans.

* Expansion joint material and joint sealer is not required for that portion of the curb which is adjacent to a flexible type pavement. Both materials are required as detailed for the full height of rigid pavement and concrete bases.

⊕ Butt joints shall be provided between combined curb-and-gutter and new rigid pavements, with tie bars or hook bolts provided at five foot intervals. Combined curb-and-gutter shall be tied to existing rigid pavements with expansion hook bolts spaced at five foot intervals. If the combined curb-and-gutter adjoins a new rigid base or an existing rigid base or pavement that is to be surfaced with bituminous material, a butt joint shall be provided and tie bars, hook bolts or expansion hook bolts shall be omitted.



TYPE 8

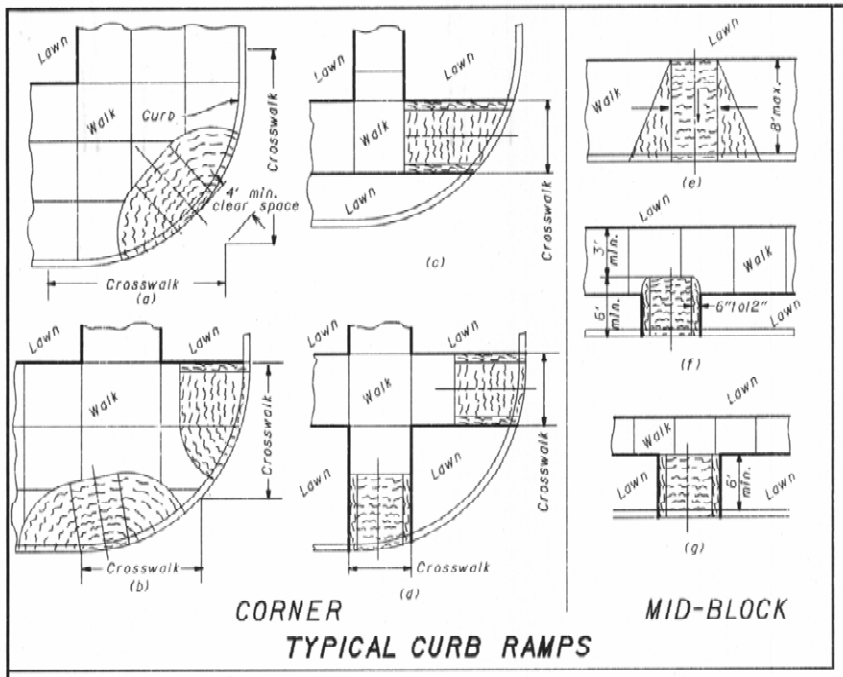
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

CONCRETE CURBS AND COMBINED CURB AND GUTTER

DATE 2-21-92

STANDARD CONSTRUCTION DRAWING **BP-5.1**

APPROVED D.K. Hulman ENGR., L. & D.



NOTES

PAYMENT: Walk and curb, Items 608 and 609, shall be measured through the curb ramp area and paid for under their respective items. Item "608, each, Curb ramp" constructed in new curb and walk shall include the cost of any additional materials, grading, forming and finishing. Item "608, square foot, Curb Ramp", constructed in existing curb and walk shall include the cost of furnishing all materials, grading, forming, and finishing of the curb and walk of the curb ramp. Removal of existing curb and walk shall be paid for under Item 202.

SURFACE TEXTURE shall be obtained by coarse brooming transverse to the ramp slopes and shall be rougher than adjacent walk.

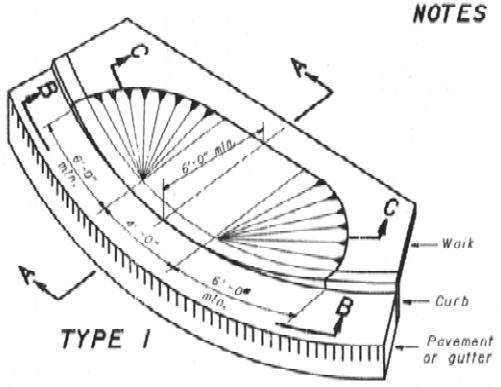
JOINTS shall be provided in the curb ramp as extensions of walk joints and consistent with 608.03 requirements for a new concrete walk. A ½ inch 705.03 expansion joint filler shall be provided around the edge of ramps built in existing concrete walk. Lines shown on this drawing indicate the ramp edge and slope changes and are not necessarily joint lines.

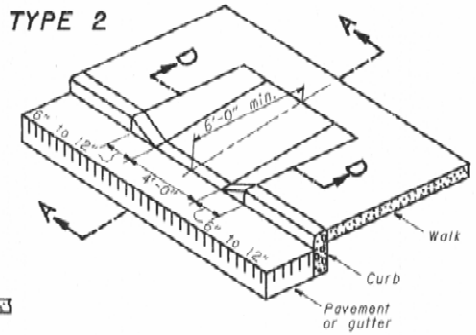
DIMENSIONS, LOCATION AND TYPE of curb ramp may be modified as directed by the engineer in accordance with the following:

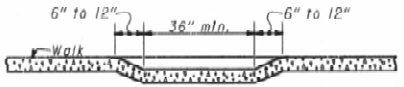
- **TYPE** of curb ramp built shall be the type that best fits the location unless a type is specified in the plans.

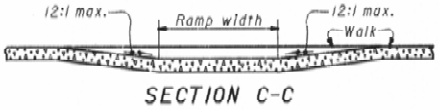
  Type 1 is preferred because of the flatter side slopes. Any combination of Type 1 and 2 side slopes on opposite sides of a ramp may be used to best fit the site conditions.

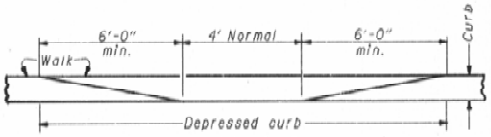
  TYPE 1 Curb Ramps (Flared sides) should be used at locations where pedestrians must walk across the ramp at an angle. Typical Curb Ramps (a),(b), and (e) are examples. TYPE 2 Curb Ramps (Steep sides) should be used where pedestrians would not normally walk across or perpendicular to the centerline of the ramp. Sides of these ramps must be parallel to the pedestrian flow. Typical Curb Ramps (c), (d), (f) and (g) are examples.
- **SLOPE** of the ramp toward the curb is preferred to be 12:1 or flatter related to the horizontal but the maximum slope shall be 12:1 relative to the existing or proposed walk slope. The minimum ramp length is 6 ft. from the back of a 6 in. curb and may be increased where feasible to obtain a flatter ramp slope or to better blend with the walk configuration.
- **WIDTH** of ramp shall normally be 4 ft. but a minimum width of 3 ft. may be used to better fit the walk configuration or where site conditions are restricted by narrow walks, pole foundations, drainage inlets, etc. The width may be tapered.
- **WALK THICKNESS** in the ramp slopes shall be 4 in. minimum or thicker as necessary to match adjacent walk thickness.

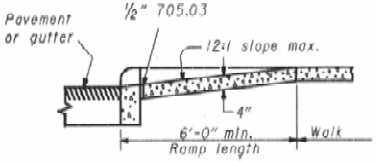


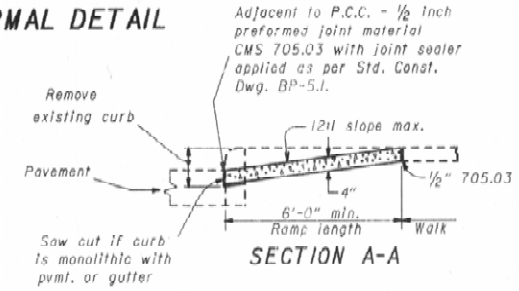




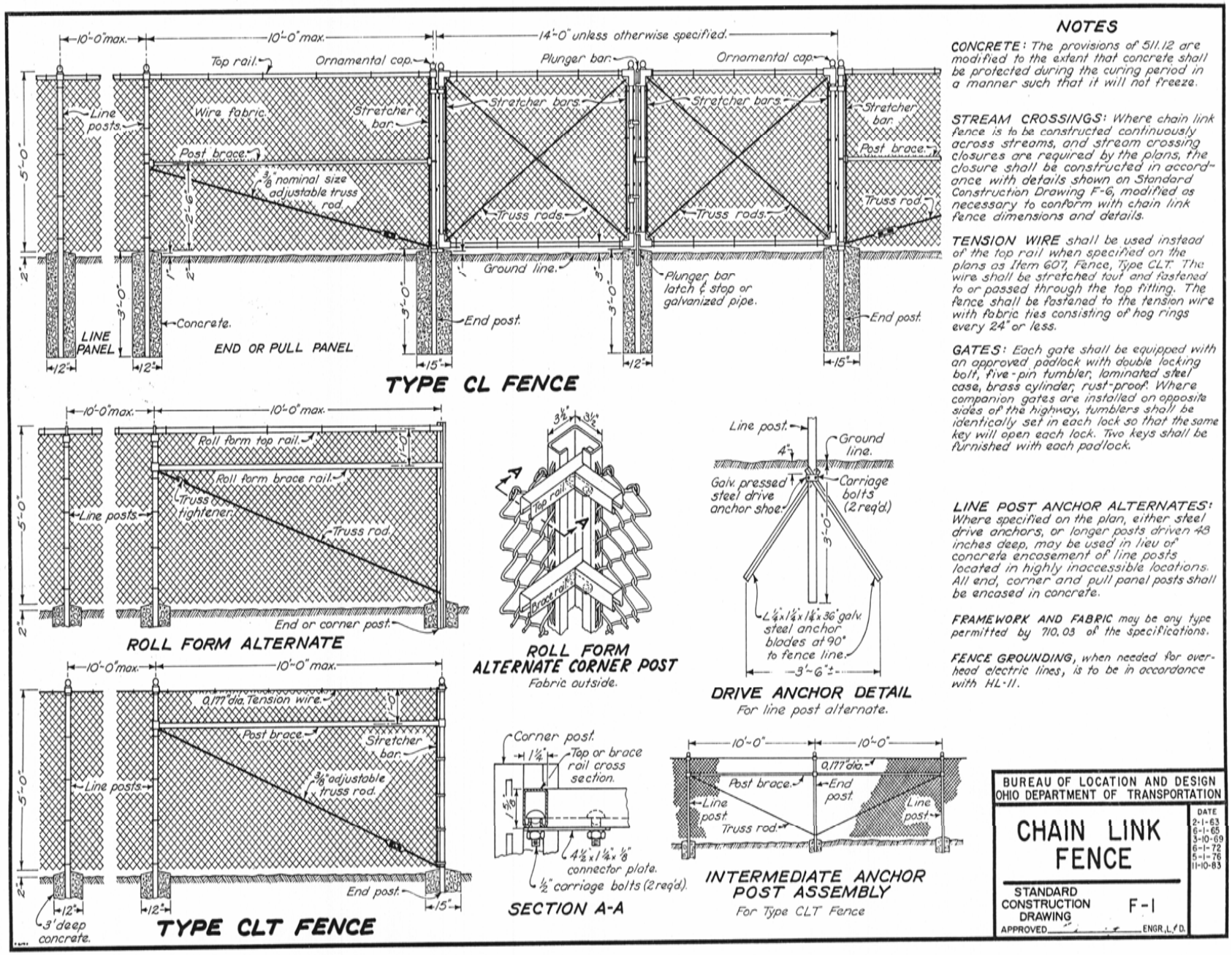




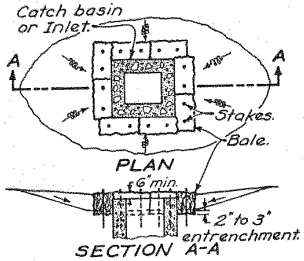




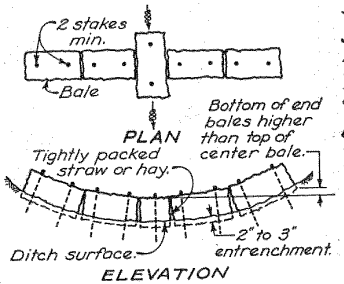
BUREAU OF LOCATION AND DESIGN OHIO DEPARTMENT OF TRANSPORTATION	
CURB RAMPS	DATE 2-21-92 10-30-92
STANDARD CONSTRUCTION DRAWING **BP-7.1** APPROVED E.K. Hartmann ENGR., L & D	


10'-0" max.
10'-0" max.
14'-0" unless otherwise specified.
Top rail.
Ornamental cap.
Plunger bar.
Ornamental cap.
Line posts.
Wire fabric.
Stretcher bar.
Stretcher bars.
Stretcher bars.
Stretcher bar.
Post brace.
3/8" nominal size adjustable truss rod.
Truss rods.
Truss rods.
Post brace.
Truss rod.
5'-0"
2'-6"
2'
1'
2'
3'-0"
3'-0"
3'-0"
Ground line.
Plunger bar latch & stop or galvanized pipe.
End post.
End post.
Concrete.
LINE PANEL
END OR PULL PANEL
12"
12"
15"
15"
TYPE CL FENCE
10'-0" max.
10'-0" max.
Roll form top rail.
Roll form brace rail.
Truss tightener.
Line posts.
Truss rod.
5'-0"
1'-0"
2'
End or corner post.
ROLL FORM ALTERNATE
3½"
3½"
Top rail.
Brace rail.
ROLL FORM ALTERNATE CORNER POST
Fabric outside.
Line post.
Ground line.
4"
Galv. pressed steel drive anchor shoe.
Carriage bolts (2 req'd.)
3'-0"
1¼"x1¼"x1⅛"x36" galv. steel anchor blades at 90° to fence line.
3'-6"±
DRIVE ANCHOR DETAIL
For line post alternate.
10'-0" max.
10'-0" max.
0.177" dia. Tension wire.
Post brace.
Stretcher bar.
Line posts.
⅜" adjustable truss rod.
5'-0"
1'-0"
2'
End post.
12"
12"
15"
3' deep concrete.
TYPE CLT FENCE
Corner post.
1¼"
Top or brace rail cross section.
1⅝"
4½"x1¼"x⅛" connector plate.
½" carriage bolts (2 req'd).
SECTION A-A
10'-0"
10'-0"
0.177" dia.
Post brace.
End post.
Line post.
Truss rod.
Line post.
INTERMEDIATE ANCHOR POST ASSEMBLY
For Type CLT Fence
NOTES
CONCRETE: The provisions of 511.12 are modified to the extent that concrete shall be protected during the curing period in a manner such that it will not freeze.
STREAM CROSSINGS: Where chain link fence is to be constructed continuously across streams, and stream crossing closures are required by the plans, the closure shall be constructed in accordance with details shown on Standard Construction Drawing F-6, modified as necessary to conform with chain link fence dimensions and details.
TENSION WIRE shall be used instead of the top rail when specified on the plans as Item 607, Fence, Type CLT. The wire shall be stretched taut and fastened to or passed through the top fitting. The fence shall be fastened to the tension wire with fabric ties consisting of hog rings every 24" or less.
GATES: Each gate shall be equipped with an approved padlock with double locking bolt, five-pin tumbler, laminated steel case, brass cylinder, rust-proof. Where companion gates are installed on opposite sides of the highway, tumblers shall be identically set in each lock so that the same key will open each lock. Two keys shall be furnished with each padlock.
LINE POST ANCHOR ALTERNATES: Where specified on the plan, either steel drive anchors, or longer posts driven 48 inches deep, may be used in lieu of concrete encasement of line posts located in highly inaccessible locations. All end, corner and pull panel posts shall be encased in concrete.
FRAMEWORK AND FABRIC may be any type permitted by 710.03 of the specifications.
FENCE GROUNDING, when needed for overhead electric lines, is to be in accordance with HL-11.
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION
CHAIN LINK FENCE
STANDARD CONSTRUCTION DRAWING F-1
APPROVED ENGR. L. & D.
DATE
2-1-63
6-1-65
3-10-69
6-1-72
5-1-76
11-10-83

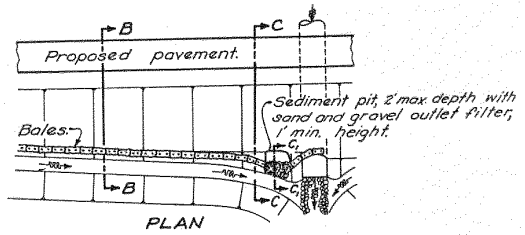
STRAW OR HAY BALES

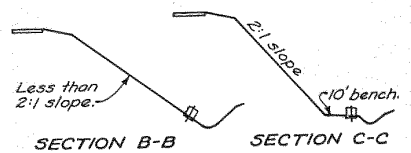


BALE INLET FILTER



BALE DITCH CHECK





BALE FILTER DIKE

Not to scale.

BALE PLACEMENT: Bales shall be tightly placed, adjacently, and entrenched 2" to 3" before staking; or a small amount of loose soil shall be lightly compacted along the upstream edge of the bales.

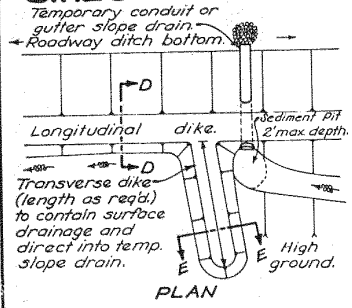
Each bale shall be firmly staked with a minimum of 2 stakes at least 3' in length. Stakes shall be wooden 2"x2", reinforcing bars or fence posts, as approved by the engineer.

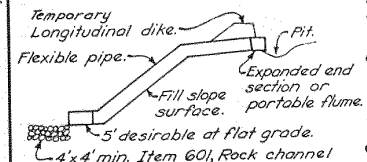
Loose straw or hay shall be scattered for a distance of 10' on the upstream side of each ditch check, and shall be wedged between and under staked bales.

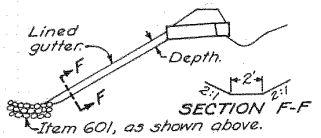
SEDIMENT PITS shall be provided where directed by the Engineer and their cost included in the price bid for adjacent 207 Items.

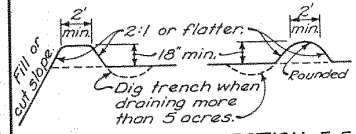
BASIS OF PAYMENT: Straw or hay bale installation shall be paid for under Item 207, Each, Straw or hay bales. Cost will include placing, staking, maintaining and removing.

DIKES AND SLOPE PROTECTION









TEMPORARY SLOPE DRAINS RECOMMENDED SIZES				
Area in acres	Pipe Sizes			Gutter depth
	Smooth	Corrugated	Half-round	
0-4	6"	6"	18"	8"
4-8	8"	12"	18"	8"
8-12	10"	15"	21"	12"

Not to scale.

GENERAL: Dikes & drains shown shall be used when earthwork operations on slopes higher than 8' are suspended for three weeks or more and/or as directed by the Engineer. Smaller dikes used at the end of a day's operation shall be considered as part of the earthwork.

Temporary slope drains shall be suitably positioned and anchored to prevent movement or undermining, as directed by the Engineer.

LONGITUDINAL DIKES shall be constructed of suitable 203 material and compacted to 85% maximum density.

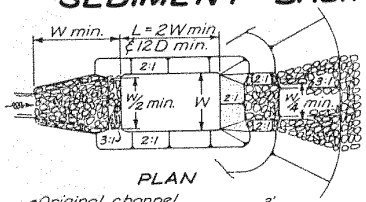
CONDUITS for slope drains shall be corrugated steel pipe, corrugated or smooth plastic pipe, rubber conduit, or an approved equal.

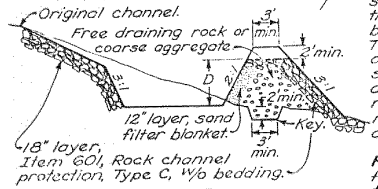
GUTTERS for slope drains shall be lined with Type C rock channel protection, crushed aggregate slope protection, portland cement concrete, bituminous concrete, plastic sheeting (on slopes 4:1 max.), partial pipe section or approved equal.

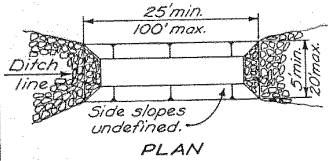
SEDIMENT PITS shall be provided where directed by the Engineer and their cost included in the price bid for adjacent 207 Items.

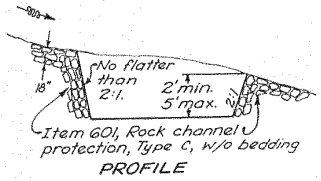
BASIS OF PAYMENT: Temporary dikes shall be paid for under Item 207, Cubic Yard, Temporary benches, dikes, dams and sediment basins. Temporary slope drains shall be paid for under Item 207, Linear Foot, Temporary Slope drains. Rock required shall be paid for under Item 601, Rock channel protection, Type C, w/o bedding.

SEDIMENT BASINS & DAMS









Not to scale.

EMBANKMENT for sediment basin construction shall be as per 203 compacted as directed by the Engineer.

MAINTENANCE: Sediment pits, dams and basins shall be acceptably maintained. Deposited sediment shall be removed when the initial volume has been reduced one-half. The sand filter blanket on sediment basins shall be replaced when deposited sediment is removed. The cost of maintenance shall be covered by Item 207.

FILTERS: Plastic filter fabric, as approved by the engineer, may be substituted for the sand filter blanket on sediment dams. Such fabrics may be cleaned in lieu of replacement, when approved by the Engineer.

SIZE: A series of smaller basins or dams may be substituted for a larger basin or dam when approved by the Engineer.

BASIS OF PAYMENT: Sediment Dams and Basins shall be paid for under Item 207 Cubic Yard Temporary benches, dikes, dams and sediment basins. Rock required shall be paid for under Item 601, Cubic Yard, Rock channel protection, Type C, w/o bedding.

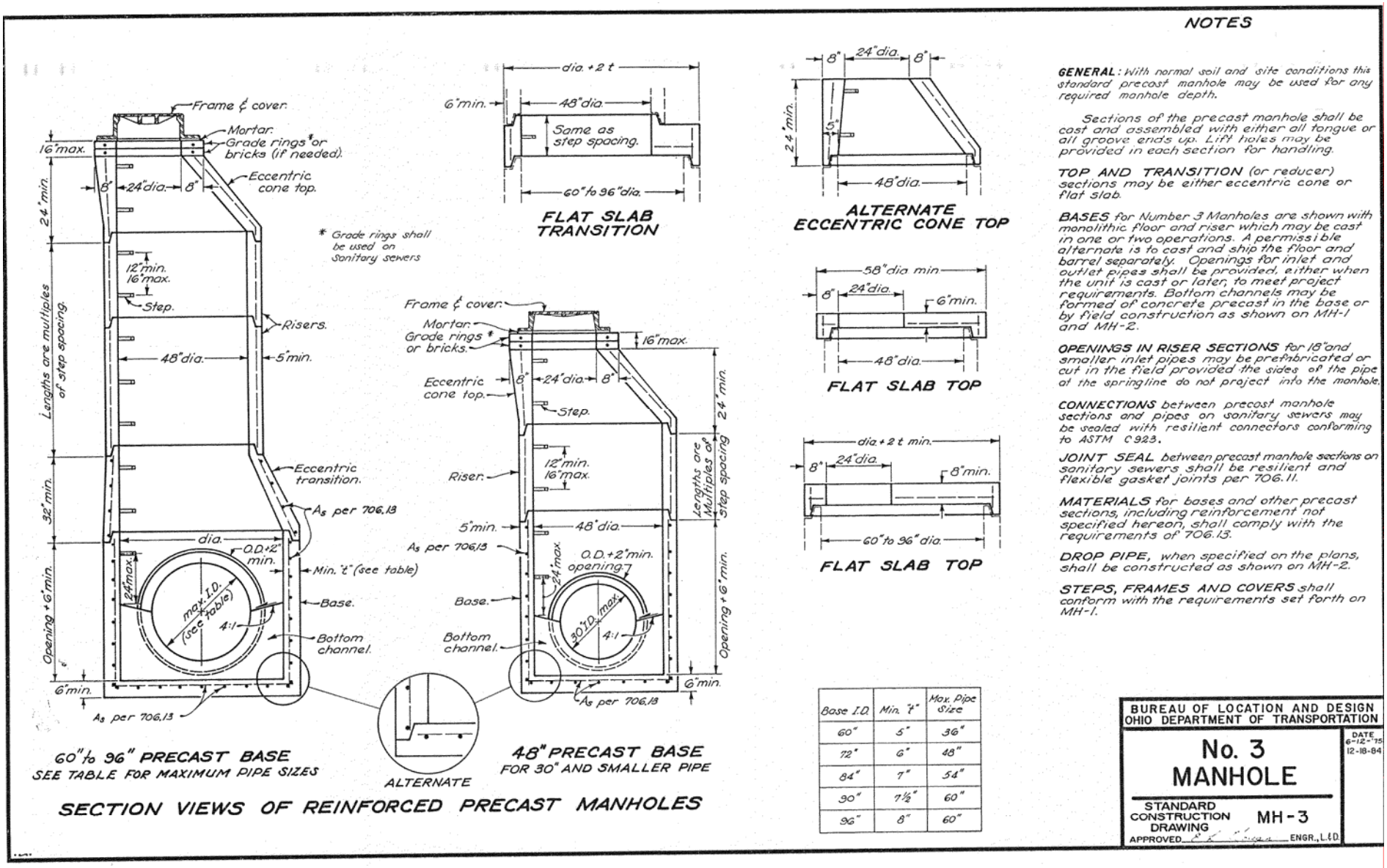
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

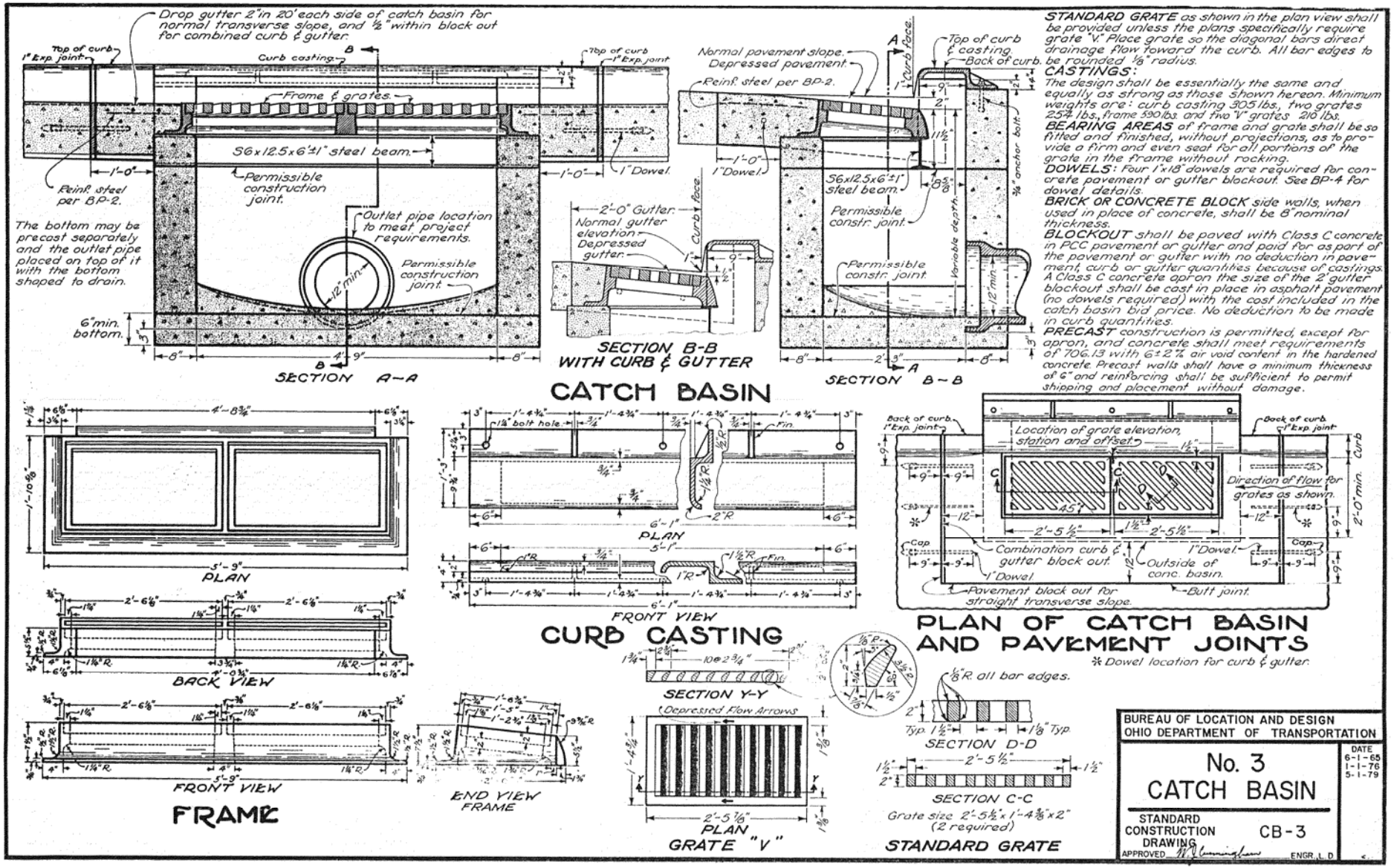
DATE 8-1-78

TEMPORARY EROSION CONTROL

STANDARD CONSTRUCTION DRAWING MC-11

APPROVED W. J. Cunningham ENGR., L. & D.


NOTES
GENERAL: With normal soil and site conditions this standard precast manhole may be used for any required manhole depth.
Sections of the precast manhole shall be cast and assembled with either all tongue or all groove ends up. Lift holes may be provided in each section for handling.
TOP AND TRANSITION (or reducer) sections may be either eccentric cone or flat slab.
BASES for Number 3 Manholes are shown with monolithic floor and riser which may be cast in one or two operations. A permissible alternate is to cast and ship the floor and barrel separately. Openings for inlet and outlet pipes shall be provided, either when the unit is cast or later, to meet project requirements. Bottom channels may be formed of concrete precast in the base or by field construction as shown on MH-1 and MH-2.
OPENINGS IN RISER SECTIONS for 18" and smaller inlet pipes may be prefabricated or cut in the field provided the sides of the pipe at the springline do not project into the manhole.
CONNECTIONS between precast manhole sections and pipes on sanitary sewers may be sealed with resilient connectors conforming to ASTM C923.
JOINT SEAL between precast manhole sections on sanitary sewers shall be resilient and flexible gasket joints per 706.11.
MATERIALS for bases and other precast sections, including reinforcement not specified hereon, shall comply with the requirements of 706.13.
DROP PIPE, when specified on the plans, shall be constructed as shown on MH-2.
STEPS, FRAMES AND COVERS shall conform with the requirements set forth on MH-1.
Frame & cover.
Mortar.
Grade rings* or bricks (if needed).
Eccentric cone top.
16"max.
24"min.
8"
24"dia.
8"
12"min.
16"max.
Step.
Risers.
5"min.
48"dia.
Lengths are multiples of step spacing.
32"min.
Eccentric transition.
As per 706.13
dia.
O.D.+2" min.
24"max.
max. I.D. (see tables)
4:1
Min. "t" (see table)
Base.
Bottom channel.
Opening +6"min.
6"min.
As per 706.13
* Grade rings shall be used on Sanitary sewers
dia.+2t
6"min.
48"dia.
Same as step spacing.
60" to 96" dia.
FLAT SLAB TRANSITION
60" to 96" PRECAST BASE
SEE TABLE FOR MAXIMUM PIPE SIZES
Frame & cover.
Mortar.
Grade rings* or bricks.
16"max.
Eccentric cone top.
8"
24"dia.
8"
Step.
12"min.
16"max.
Riser.
5"min.
48"dia.
As per 706.13
24"max.
O.D.+2"min. opening
30"D. max.
4:1
Base.
Bottom channel.
Lengths are Multiples of 6" step spacing
24"min.
Opening +6"min.
6"min.
As per 706.13
48" PRECAST BASE
FOR 30" AND SMALLER PIPE
ALTERNATE
SECTION VIEWS OF REINFORCED PRECAST MANHOLES
8"
24"dia.
8"
24"min.
5"
48"dia.
ALTERNATE ECCENTRIC CONE TOP
58"dia min.
8"
24"dia.
6"min.
48"dia.
FLAT SLAB TOP
dia.+2t min.
8"
24"dia.
8"min.
60" to 96" dia.
FLAT SLAB TOP
Base I.D. | Min. "t" | Max. Pipe Size
60" | 5" | 36"
72" | 6" | 48"
84" | 7" | 54"
90" | 7½" | 60"
96" | 8" | 60"
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION
DATE 6-12-75 12-18-84
No. 3 MANHOLE
STANDARD CONSTRUCTION DRAWING
MH-3
APPROVED ENGR., L.&D.

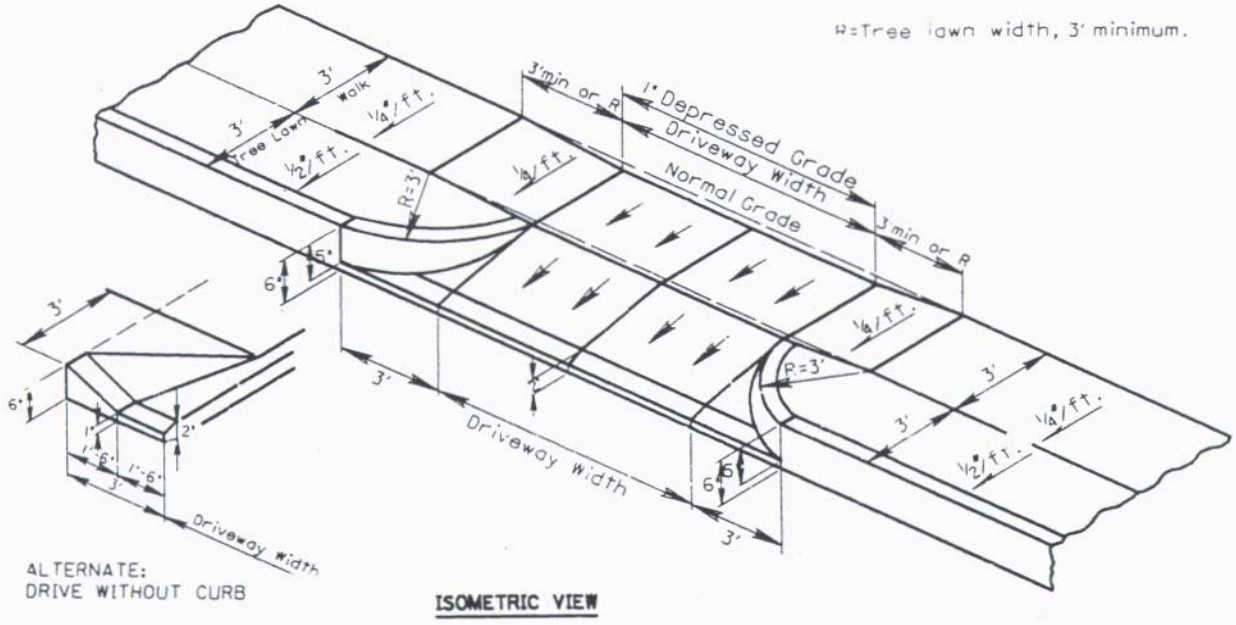

Drop gutter 2" in 20' each side of catch basin for normal transverse slope, and ½" within block out for combined curb & gutter.
Top of curb 1" Exp. joint
Curb casting
Frame & grates
56x12.5x6'±1" steel beam.
Permissible construction joint.
Outlet pipe location to meet project requirements.
12" min.
6" min. bottom.
Reinf. steel per BP-2.
The bottom may be precast separately and the outlet pipe placed on top of it with the bottom shaped to drain.
1'-0"
1" Dowel
2'-9"
SECTION A-A
2'-0" Gutter
Normal gutter elevation Depressed gutter
1" Curb face
SECTION B-B WITH CURB & GUTTER
Normal pavement slope. Depressed pavement.
Reinf. steel per BP-2.
Top of curb & casting
Back of curb
1" Curb face
56x12.5x6'±1" steel beam.
Permissible constr. joint.
Variable depth
¾" anchor bolt
12" min.
SECTION B-B
CATCH BASIN
STANDARD GRATE as shown in the plan view shall be provided unless the plans specifically require grate "V". Place grate so the diagonal bars direct drainage flow toward the curb. All bar edges to be rounded ⅛" radius.
CASTINGS: The design shall be essentially the same and equally as strong as those shown hereon. Minimum weights are: curb casting 305 lbs., two grates 254 lbs., frame 590 lbs. and two "V" grates 210 lbs.
BEARING AREAS of frame and grate shall be so fitted and finished, without projections, as to provide a firm and even seat for all portions of the grate in the frame without rocking.
DOWELS: Four 1"x18" dowels are required for concrete pavement or gutter blockout. See BP-4 for dowel details.
BRICK OR CONCRETE BLOCK side walls, when used in place of concrete, shall be 8" nominal thickness.
BLOCKOUT shall be paved with Class C concrete in PCC pavement or gutter and paid for as part of the pavement or gutter with no deduction in pavement, curb or gutter quantities because of castings. A Class C concrete apron the size of the 2' gutter blockout shall be cast in place in asphalt pavement (no dowels required) with the cost included in the catch basin bid price. No deduction to be made in curb quantities.
PRECAST construction is permitted, except for apron, and concrete shall meet requirements of 706.13 with 6±2% air void content in the hardened concrete. Precast walls shall have a minimum thickness of 6" and reinforcing shall be sufficient to permit shipping and placement without damage.
4'-8¾"
1'-10⅝"
5'-9"
PLAN
2'-6⅛"
1⅛" R.
3⅜"
4'-0¾"
BACK VIEW
FRONT VIEW
FRAME
1'-4¾"
½" bolt hole
¾"
½" R
2" R
6'-1"
PLAN
1" R
1½" R
Fin.
FRONT VIEW
CURB CASTING
Back of curb 1" Exp. joint
Location of grate elevation, station and offset
Direction of flow for grates as shown.
2'-0" min. Curb
45°
2'-5½"
Combination curb & gutter block out.
1" Dowel
Outside of conc. basin.
Butt joint.
Pavement block out for straight transverse slope.
PLAN OF CATCH BASIN AND PAVEMENT JOINTS
* Dowel location for curb & gutter.
10@2¾"
SECTION Y-Y
Depressed Flow Arrows
2'-5⅛"
PLAN
GRATE "V"
⅛" R. all bar edges.
Typ. 1½"
⅛" Typ.
SECTION D-D
SECTION C-C
Grate size 2'-5½" x 1'-4⅜" x 2" (2 required)
STANDARD GRATE
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION
No. 3
CATCH BASIN
STANDARD CONSTRUCTION DRAWING
CB-3
APPROVED
ENGR. L. D.
DATE
6-1-65
1-1-76
5-1-79

October 1992

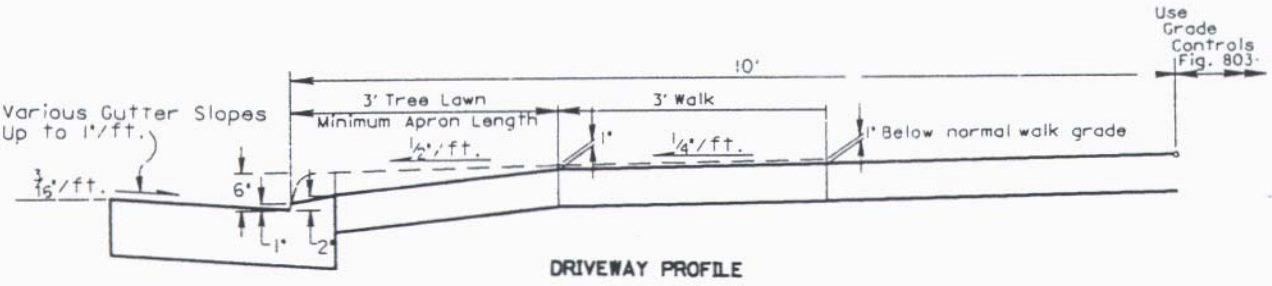
URBAN RESIDENTIAL DRIVE DETAILS

803-3

REFERENCE SECTION
803.3 & 804.2

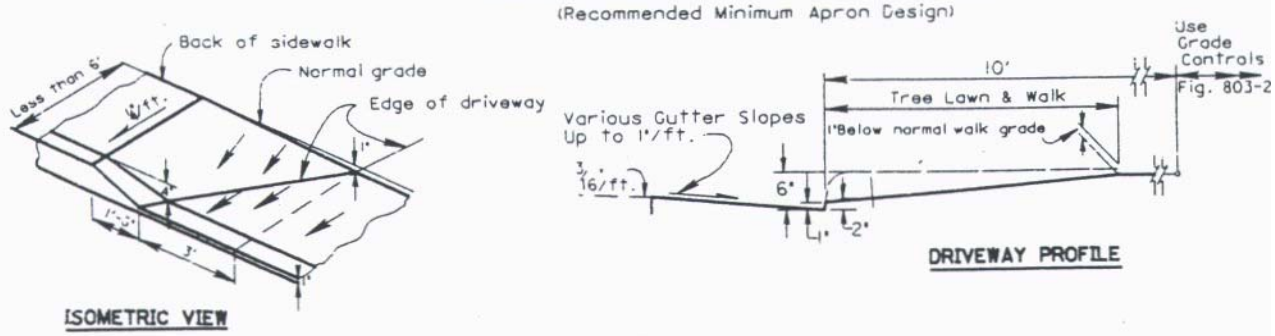


ISOMETRIC VIEW



DRIVEWAY PROFILE

EXAMPLE: 3' TREE LAWN WITH 3' WALK DEPRESSED 1"
(Recommended Minimum Apron Design)



ISOMETRIC VIEW

DRIVEWAY PROFILE

EXAMPLE: TREE LAWN AND WALK, LESS THAN 6'
WALK DEPRESSED 1"

RESIDENTIAL DRIVEWAY PROFILES
LESS THAN 6' TREE LAWN

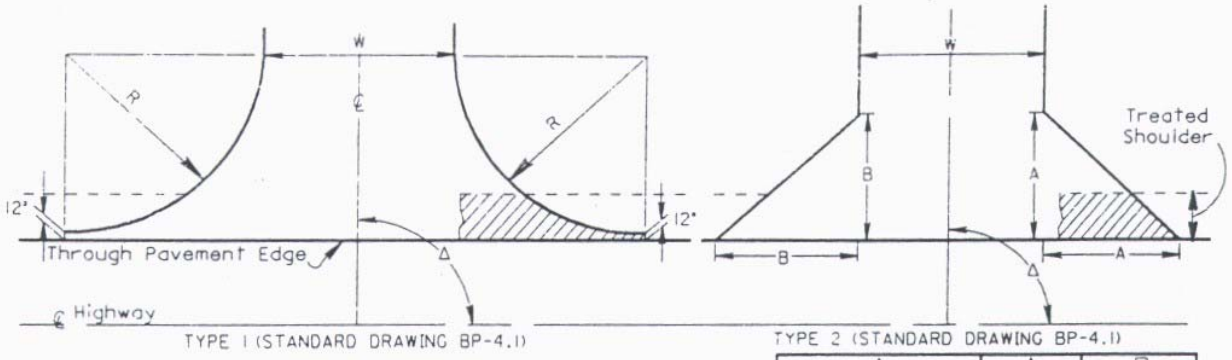
October 1992

STANDARD COMMERCIAL DRIVE DESIGNS

803-8

REFERENCE SECTION 803.51

UNCURBED DRIVEWAY ALONG UNCURBED HIGHWAY

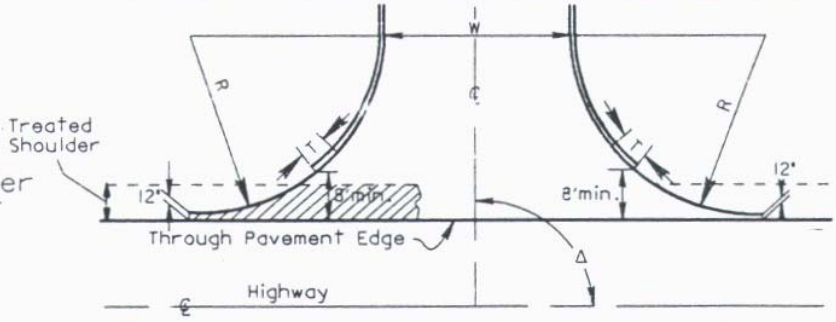


W = 35 ft. Maximum
R = 25 ft. Minimum on Uncurbed Highway
15 ft. Minimum on Curbed Highway
T = Taper Curb Height from 6 in. to 2 in. in. 4 ft.
Δ = 70° to 90° (two-way operation)

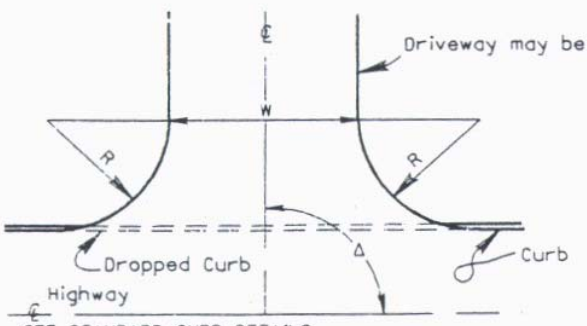
Δ	A	B
85° to 90°	20'	20'
75° to 85°	25'	16'
65° to 75°	28'	13'
55° to 65°	33'	12'

CURBED DRIVEWAY ALONG UNCURBED HIGHWAY

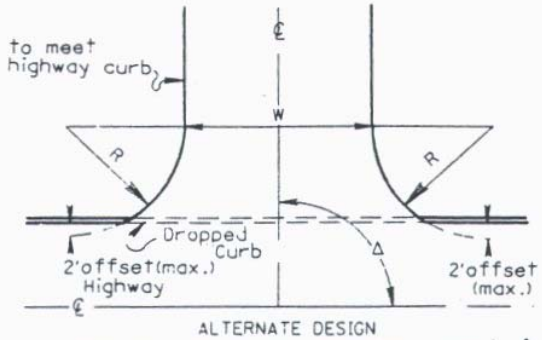
- Do not replace treated shoulder in this portion of drive flare if shoulder has equal or better pavement buildup.



CURBED OR UNCURBED DRIVEWAYS ALONG CURBED HIGHWAY

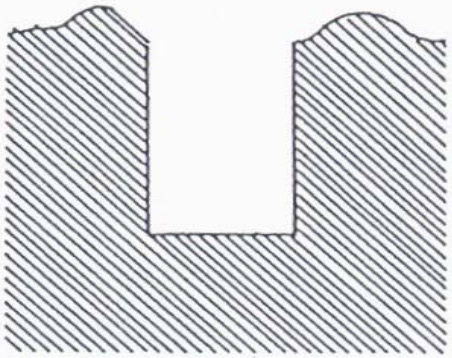


SEE STANDARD CURB DETAILS STANDARD DRAWING BP-4.1

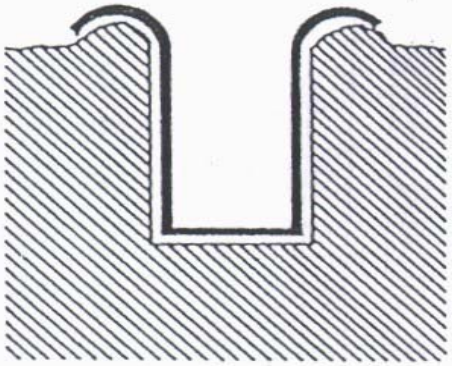


ALTERNATE DESIGN
To be used when smaller curb opening is required. (or curb and gutter used)

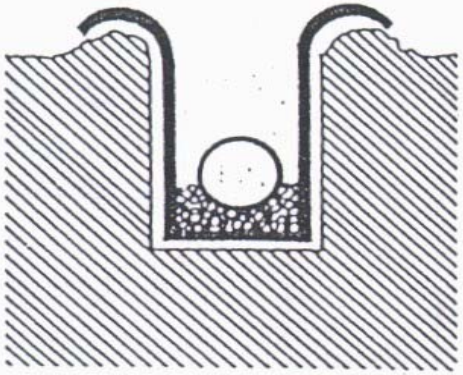
Procedure for Fabric-Lined Underdrain Construction



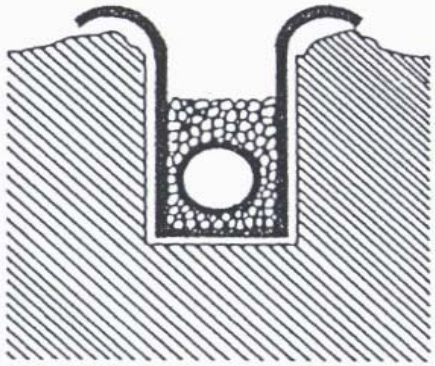
1. Excavate Trench



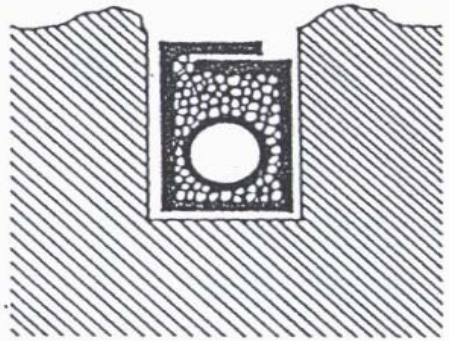
2. Place Fabric



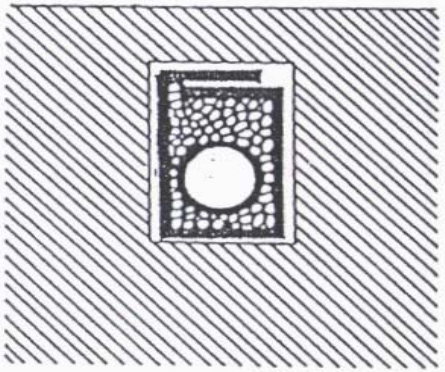
3. Add Initial Layer



4. Place/Compact Remainder of Material



5. Wrap Fabric Over Top



6. Compact Backfill

FABRIC - LINED UNDERDRAINS

APPENDIX B

ODNR SECTION 1521.06
OHIO DAM SAFETY LAWS

Listed herein are Ohio Dam Safety Laws as contained in portions of Title XV, Chapter 1521 of the Ohio Revised Code, requiring the ODNR, Division of Water to issue permits for construction of dams, dikes, and levees, and to make periodic inspections of existing dams, dikes, and levees in the interest of protecting life, health, and property. Amendments to section 1521.06 were passed as part of Amended Substitute House Bill 171 and became effective July 1, 1987; amendments to sections 1521.061, 1521.062, and 1521.063 and the new section 1521.064 were passed in Amended House Bill 602 and became effective September 28, 1990; section 1521.07 was passed as part of Amended Senate Bill 224 and became effective December 18, 1969. Minor changes to section 1521.99 were included in Substitute House Bill 476 which became effective July 18, 1990. Please note that existing Division of Water Administrative Rules contained in Chapter 1501.21 of the Ohio Administrative Code remain in effect. The dam safety sections of Ohio law are as follows:

Section 1521.06	Construction Permits for Dams, Dikes, and Levees
Section 1521.061	Surety Bond Requirements of Construction Permits
Section 1521.062	Periodic Inspection of Existing Dams, Dikes, and Levees
Section 1521.063	Annual Inspection Fee
Section 1521.064	Inspection Exemptions
Section 1521.07	Right of Entry
Section 1521.99	Penalties

Section 1521.06 Construction permits for dams, dikes, or levees.

A. No dam may be constructed for the purpose of storing, conserving, or retarding water, or for any other purpose, nor shall any dike or levee be constructed for the purpose of diverting or retaining flood water, unless the person or governmental agency desiring the construction has a construction permit for the dam, dike, or levee issued by the chief of the division of water.

A construction permit is not required under this section for:

1. A dam which is or will be less than ten feet in height and which has or will have a storage capacity of not more than fifty acre-feet at the elevation of the top of the dam, as determined by the chief. For the purposes of this section, the height of a dam shall be measured from the natural stream bed or lowest ground elevation at the downstream or outside limit of the dam to the elevation of the top of the dam.
2. A dam, regardless of height, which has or will have a storage capacity of not more than fifteen acre-feet at the elevation of the top of the dam, as determined by the chief.

3. A dam, regardless of storage capacity, which is or will be six feet or less in height, as determined by the chief.
4. A dam, dike, or levee which belongs to a class exempted by the chief.
5. The repair, maintenance, improvement, alteration, or removal of a dam, dike, or levee which is subject to section 1521.062 of the Revised Code, unless the construction constitutes an enlargement of the structure as determined by the chief.
6. A dam or impoundment constructed under Chapter 1513 of the Revised Code.

B. Before a construction permit may be issued, three copies of the plans and specifications, including a detailed cost estimate, for the proposed construction, prepared by a registered professional engineer, together with the filing fee specified by this section and the bond or other security required by section 1521.061 of the Revised Code, shall be filed with the chief. The detailed estimate of the cost shall include all costs associated with the construction of the dam, dike, or levee, including supervision and inspection of the construction by a registered professional engineer. Except for a political subdivision, the filing fee shall be based on the detailed cost estimate for the proposed construction as filed with and approved by the chief, and shall be determined by the following schedule:

1. For the first one hundred thousand dollars of estimated cost, a fee of two percent;
2. For the next four hundred thousand dollars of estimated cost, a fee of one and one-half percent;
3. For the next five hundred thousand dollars of estimated cost, a fee of one percent;
4. For all costs in excess of one million dollars, a fee of one-quarter of one percent.

In no case shall the filing fee be less than two hundred dollars or more the fifty thousand dollars. If the actual cost exceeds the estimated cost by more than fifteen percent, an additional filing fee shall be required equal to the fee determined by the preceding schedule less the original filing fee. The filing fee for a political subdivision shall be two hundred dollars. All fees collected pursuant to this section, and all fines collected pursuant to section 1521.99 of the Revised Code, shall be deposited in the state treasury to the credit of the dam safety fund, which is hereby created. Expenditures from the fund shall be made by the chief for the purpose of administering this section and sections 1521.061 and 1521.062 of the Revised Code.

C. The chief shall, within thirty days from the date of the receipt of the application, fee, and bond or other security, issue or deny a construction permit for the construction or may issue a construction permit conditioned upon the making of such changes in the plans and specifications for the construction as he considers advisable if he determines that the construction of the proposed dam, dike, or levee, in accordance with the plans and specifications filed, would endanger life, health, or property.

D. The chief may deny a construction permit if he finds that a dam, dike, or levee built in accordance with the plans and specifications would endanger life, health, or property,

because of improper or inadequate design, or for such other reasons as the chief may determine.

In the event the chief denies a permit for the construction of the dam, dike, or levee, or issues a permit conditioned upon a making of changes in the plans or specifications for the construction, he shall state his reasons therefore and so notify, in writing, the person or governmental agency making the application for a permit. If the permit is denied, the chief shall return the bond or other security to the person or governmental agency making application for the permit.

The decision of the chief conditioning or denying a construction permit is subject to appeal as provided in Chapter 119 of the Revised Code. A dam, dike, or levee built substantially at variance from the plans and specifications upon which a construction permit was issued is in violation of this section. The chief may at any time inspect any dam, dike, or levee, or site upon which any dam dike, or levee is to be constructed, in order to determine whether it complies with this section.

E. A registered professional engineer shall inspect the construction for which the permit was issued during all phases of construction and shall furnish to the chief such regular reports of his inspections as the chief may require. When the chief finds that construction has been fully completed in accordance with the terms of the permit and the plans and specifications approved by him, he shall approve the construction. When one year has elapsed after approval of the completed construction, and the chief finds that within this period no fact has become apparent to indicate that the construction was not performed in accordance with the terms of the permit and the plans and specifications approved by the chief, or that the construction as performed would endanger life, health, or property, he shall release the bond or other security. No bond or other security shall be released until one year after final approval by the chief, unless the dam, dike, or levee has been modified so that it will not retain water and has been approved as nonhazardous after determination by the chief that the dam, dike, or levee as modified will not endanger life, health, or property.

F. When inspections required by this section are not being performed, the chief shall notify the person or governmental agency to which the permit has been issued that inspections are not being performed by the registered professional engineer and that the chief will inspect the remainder of the construction. Thereafter, the chief shall inspect the construction and the cost of inspection shall be charged against the owner. Failure of the registered professional engineer to submit required inspection reports shall be deemed notice that his inspections are not being performed.

G. The chief may order construction to cease on any dam, dike, or levee which is being built in violation of the provisions of this section, and may prohibit the retention of water behind any dam, dike, or levee which has been built in violation of the provisions of this section. The attorney general, upon written request of the chief, may bring an action for an injunction against any person who violates this section or to enforce an order or prohibition of the chief made pursuant to this section.

H. The chief may adopt rules in accordance with Chapter 119 of the Revised Code, for the design and construction of dams, dikes, and levees for which a construction permit is required by this section or for which periodic inspection is required by section 1521.062 of the Revised Code, for deposit and forfeiture of bonds and other securities required by section 1521.061 of the Revised Code, for the periodic inspection, operation, repair, improvement, alteration, or removal of all dams, dikes, and levees as specified in section 1521.062 of the Revised Code, and for establishing classes of dams, dikes, or levees which are exempt from the requirements of section 1521.06 and 1521.062 of the Revised Code as being of a size, purpose, or situation which does not present a substantial hazard to life, health, or property. The chief may, by rule, limit the period during which a construction permit issued under this section is valid. If a construction permit expires before construction is completed, the person or agency shall apply for a new permit, and shall not continue construction until the new permit is issued.

I. As used in this section and section 1521.063 of the Revised Code, "political subdivision" includes townships, municipal corporations, counties, school districts, municipal universities, park districts, sanitary districts, and conservancy districts and subdivisions thereof.

Section 1521.061 Surety bond requirements of construction permits.

Except as otherwise provided in this section, a construction permit shall not be issued under section 1521.06 of the Revised Code unless the person or governmental agency applying for the permit executes and files a surety bond conditioned on completion of the dam, dike, or levee in accordance with the terms of the permit and the plans and specifications approved by the chief of the division of water, in an amount equal to fifty percent of the estimated cost of the project.

The chief shall not approve any bond until it is personally signed and acknowledged by both principal and surety, or as to either by his attorney in fact, with a certified copy of the power of attorney attached. The chief shall not approve the bond unless there is attached a certificate of the superintendent of insurance that the company is authorized to transact a fidelity and surety business in this state.

All bonds shall be given in a form prescribed by the chief and shall run to the state as obligee.

The applicant may deposit, in lieu of a bond, cash in an amount equal to the amount of the bond or United States government securities or negotiable certificates of deposit issued by any bank organized or transacting business in this state having a par value equal to or greater than the amount of the bond. Such cash or securities shall be deposited upon the same terms as bonds. If one or more certificates of deposit are deposited in lieu of a bond, the chief shall require the bank which issued any such certificate to pledge securities of the aggregate market value equal to the amount of the certificate which is in excess of the amount insured by the federal deposit insurance corporation. The securities to be pledged shall be those designated as eligible under section 135.18 of the Revised Code. The securities shall be security for the repayment of the certificate of deposit.

Immediately upon a deposit of cash, securities, or certificates of deposit, the chief shall deliver them to the treasurer of state, who shall hold them in trust for the purposes for which they have been deposited. The treasurer of state is responsible for the safekeeping of such deposits. An applicant making a deposit of cash, securities, or certificates of deposit may withdraw and receive from the treasurer of state, on the written order of the chief, all or any portion of the cash, securities, or certificates of deposit, upon depositing with the treasurer of state cash, other United States government securities, or negotiable certificates of deposit issued by any bank organized or transacting business in this state equal in par value to the par value of the cash, securities, or certificates of deposit withdrawn. An applicant may demand and receive from the treasurer of state all interest or other income from any such securities or certificates as it becomes due. If securities so deposited with and in the possession of the treasurer of state mature or are called for payment by the issuer thereof, the treasurer of state, at the request of the applicant who deposited them, shall convert the proceeds of the redemption or payment of the securities into such other United States government securities, negotiable certificates of deposit issued by any bank organized or transacting business in this state, or cash as the applicant designates.

When the chief finds that a person or governmental agency has failed to comply with the conditions of his bond, he shall make a finding of that fact and declare the bond, cash, securities, or certificates of deposit forfeited in the amount set by rule of the chief. The chief shall thereupon certify the total forfeiture to the attorney general, who shall proceed to collect that amount.

In lieu of total forfeiture, the surety, at its option, may cause the dam, dike, or levee to be completed as required by section 1521.06 of the Revised Code and rules of the chief, or otherwise rendered nonhazardous, or pay to the treasurer of state the cost thereof.

All monies collected on account of forfeitures of bonds, cash, securities, and certificates of deposit under this section shall be credited to the dam safety fund created in section 1521.06 of the Revised Code. The chief shall make expenditures from the fund to complete dams, dikes, and levees for which bonds have been forfeited or to otherwise render them nonhazardous.

Expenditures from the fund for those purposes shall be made pursuant to contracts entered into by the chief with persons who agree to furnish all of the materials, equipment, work, and labor as specified and provided in the contract.

A surety bond shall not be required for a permit for a dam, dike, or levee that is to be designed and constructed by an agency of the United States government, if the agency files with the chief written assurance of the agency's financial responsibility for the structure during the one-year period following the chief's approval of the completed construction provided for under division (E) of section 1521.06 of the Revised Code.

Section 1521.062 Periodic inspection of existing dams, dikes, and levees.

A. All dams, dikes, and levees constructed in this state and not exempted by this section or by the chief of the division of water under section 1521.06 of the Revised Code shall be inspected periodically by the chief to ensure that continued operation and use of the dam,

dike, or levee does not constitute a hazard to life, health, or property. Periodic inspections shall not be required of the following structures:

1. A dam that is less than ten feet in height and has a storage capacity of not more than fifty acre-feet at the elevation of the top of the dam, as determined by the chief. For the purposes of this section, the height of a dam shall be measured from the natural stream bed or lowest ground elevation at the downstream or outside limit of the dam to the elevation of the top of the dam.
2. A dam, regardless of height, that has a storage capacity of not more than fifteen acre-feet at the elevation of the top of the dam, as determined by the chief;
3. A dam, regardless of storage capacity, that is six feet or less in height, as determined by the chief;
4. A dam, dike, or levee belonging to a class exempted by the chief;
5. A dam, dike, or levee that has been exempted in accordance with rules adopted under section 1521.064 of the Revised Code.

B. Intervals between periodic inspections shall be determined by the chief, but shall not exceed five years. The chief may use inspection reports prepared for the owner of the dam, dike, or levee by a registered professional engineer.

C. The owner shall be furnished a report of each inspection and shall be informed of required repairs, maintenance, investigation, and other remedial and operational measures by the chief. The chief shall order the owner to perform such repairs, maintenance, investigations, or other remedial or operational measures as he considers necessary to safeguard life, health, or property. The order shall permit the owner a reasonable time in which to perform the needed repairs, maintenance, investigations, or other remedial measures, and the cost thereof shall be borne by the owner. All orders of the chief are subject to appeal as provided in Chapter 119 of the Revised Code. The attorney general, upon written request of the chief, may bring an action for an injunction against any person who violates this section or to enforce an order of the chief made pursuant to this section.

D. The owner of a dam, dike, or levee shall monitor, maintain, and operate the structure and its appurtenances safely in accordance with state rules, terms and conditions of permits, orders, and other requirements issued pursuant to this section or section 1521.06 of the Revised Code. The owner shall fully and promptly notify the division of water and other responsible authorities of any condition which threatens the safety of the structure and shall take all necessary actions to safeguard life, health, and property.

APPENDIX C

TYPICAL VALUES OF MANNING'S "n" COEFFICIENT

Table B-1: Typical Values of Manning's "n" Coefficients	
Description	Typical Values
Unlined Open Channels	
Earth, uniform section	
With short grass, few weeds	0.022-0.027
In gravely soils, uniform section, clean	0.022-0.025
Earth, fairly uniform section	
No vegetation	0.022-0.025
Grass, some weeds	0.025-0.030
Dense weeds or aquatic plants in deep channels	0.030-0.035
Sides, clean, gravel bottom	0.025-0.030
Sides, clean, cobble bottom	0.030-0.040
Dragline excavated or dredged	
No vegetation	0.028-0.033
Light brush on banks	0.035-0.050
Rock	
Based on design section	0.035
Based on actual mean section	0.035-0.040
- Smooth and uniform	0.040-0.045
- Jagged and irregular	
Channels not maintained, weeds and brush uncut	
Dense weeds, high as flow depth	0.08-0.12
Clean bottom, brush on sides	0.05-0.08
Clean bottom, brush on sides, highest stage of flow	0.07-0.11
Dense brush, high stage	0.10-0.14
Roadside channels and swales with maintained vegetation (for velocities of 2 and 6 ft/s)	
Depth of flow up to 0.7 ft	
Bermuda grass, Kentucky bluegrass, buffalo grass:	
- Mowed to 2 in.	0.045-0.07
- Length 4 to 6 in.	0.05-0.09
Good stand, any grass:	0.09-0.18
- Length about 12 in.	0.15-0.30
- Length about 24 in.	0.08-0.14
Fair stand, any grass:	0.13-0.25
- Length about 12 in.	
- Length about 24 in.	
Depth of flow 0.7-1.5 ft	
Bermuda grass, Kentucky bluegrass, buffalo grass:	

- Mowed to 2 in.	0.035-0.05
- Length 4 to 6 in.	0.04-0.06
Good stand, any grass:	
- Length about 12 in.	0.07-0.12
- Length about 24 in.	0.10-0.20
Fair stand, any grass:	
- Length about 12 in.	0.06-0.10
- Length about 24 in.	0.09-0.17
Natural Stream Channels	
Minor Streams	
Fairly regular section:	
- Some grass and weeds, little or no brush	
- Dense growth of weeds, depth of flow materially greater than weed height	0.030-0.035
- Some weeds, light brush on banks	0.035-0.05
- Some weeds, heavy brush on banks	0.04-0.05
- Some weeds, dense willows on banks	0.05-0.07
- For trees within channel, with branches submerged at high stage, increase all values by	0.06-0.08 0.01-0.10
Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stage:	
- Bottom of gravel, cobbles, and few boulders	0.04-0.05
Bottom of cobbles, with large boulders	0.05-0.07
Floodplains (adjacent to natural streams):	
Pasture, no brush:	
- Short grass	0.030-0.035
- High grass	0.035-0.05
Cultivated areas:	
- No crop	0.03-0.04
- Mature row crops	0.035-0.045
- Mature field crops	0.04-0.05
Heavy weeds, scattered brush	0.05-0.07
Light brush and trees:	
- Winter	0.05-0.06
- Summer	0.06-0.08
Medium to dense brush:	
- Winter	0.07-0.11
- Summer	0.10-0.16
Major streams (surface width at flood stage more than 100 ft)	0.028-0.033
Closed conduits flowing partly full	
Metal Pipe	
Cast iron Coated Uncoated	 0.010-0.014 0.011-0.016
Wrought iron Black Galvanized	 0.012-0.015 0.013-0.017
Corrugated metal Subdrain	 0.017-0.021

Storm drain	0.021-0.030
Nonmetal Pipe	
Lucite	0.008-0.010
Glass	0.009-0.013
Cement Neat surface Mortar	 0.010-0.013 0.011-0.015
Concrete Culvert, straight and free of debris Culvert with bends, connections and some debris Finished Sewer with manholes, inlet, etc., straight Unfinished, steel form Unfinished, smooth wood form Unfinished, rough wood form	 0.010-0.013 0.011-0.015 0.011-0.015 0.013-0.017 0.012-0.014 0.012-0.016 0.015-0.020
Polyethylene Corrugated Corrugated, smooth interior Smooth wall	 0.021-0.030 0.010-0.015 0.010-0.015
Wood Stave Laminated, treated	 0.010-0.014 0.015-0.020
Clay Common drainage tile Vitrified sewer Vitrified sewer with manhole, inlet, etc. Vitrified subdrain with open joint	 0.011-0.017 0.011-0.017 0.013-0.017 0.014-0.018
Brickwork Glazed Lined with cement mortar	 0.011-0.015 0.012-0.017
Sanitary sewers coated with sewage slimes, with bends and connections	0.012-0.016
Paved invert, sewer, smooth bottom	0.016-0.020
Rubble masonry, cemented	0.018-0.030

Table B-2: Rational Coefficients	
Area	**"C" values**
Business	
Downtown	0.70-0.95
Neighborhood	0.50-0.70
Residential	
Single family	0.30-0.50
Multiunit detached	0.40-0.60
Multiunit attached	0.60-0.75
Suburban resident	0.25-0.40
Apartment	0.50-0.70
Residential (1.2 acre lots or more)	0.30-0.45
Industrial	
Light	0.50-0.80
Heavy	0.60-0.90
Parks and Cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Pavement	
Asphaltic and concrete	0.70-0.95
Brick	0.70-0.85
Drives and Walks	0.75-0.85
Roofs	0.70-0.95
Lawns, sandy soils	
Flat, 0-2%	0.05-0.10
Average, 2-7%	0.10-0.15
Steep > 7%	0.15-0.20
Lawns, heavy soils	
Flat, 0-2%	0.13-0.17
Average, 2-7%	0.18-0.22
Steep > 7%	0.25-0.35
Railroad Yard	0.20-0.40
***Detention\Retention Pond Areas**	1.00

* Engineer may submit design calculations for infiltration of rain for dry basins to reduce “C” value. An approximation of pond area may be used for post development weighted “C” Value.

APPENDIX D

FINAL PLAT CERTIFICATIONS

OWNERS CERTIFICATION

WE THE UNDERSIGNED, OWNERS OF THE PROPERTY HEREON DESCRIBED, DO HEREBY ACCEPT THIS SUBDIVISION AS SHOWN ON THIS PLAT, ESTABLISH SETBACKS AND DEDICATE TO THE PUBLIC ALL RIGHT-OF-WAYS AS SHOWN. WE DO DESIGNATE ALL EASEMENTS FOR THE CONSTRUCTION AND MAINTENANCE OF ALL PUBLIC AND QUASI-PUBLIC UTILITIES IN THE DEVELOPMENT OF THIS SUBDIVISION.

_____ _____

OWNER WITNESS

_____

WITNESS

NOTARY PUBLIC CERTIFICATION

ON THIS _____ DAY OF _____, 20___ BEFORE ME PERSONALLY APPEARED ABOVE NAMED PERSONS, AND ACKNOWLEDGED THE SIGNING OF THIS PLAT TO BE THEIR FREE ACT AND DEED.

WITNESS MY HAND AND SEAL THIS DAY AND YEAR ABOVE WRITTEN.

_____

NOTARY PUBLIC

MY COMMISSION EXPIRES _____

SENECA COUNTY ENGINEER'S CERTIFICATION (PLAT & LEGALS)

THE DRAWING AND LEGAL DESCRIPTION FOR THIS PLAT ARE HEREBY APPROVED FOR PURPOSES OF RECORDING ONLY. THIS APPROVAL DOES NOT APPLY TO CONSTRUCTION OF STREETS, SEWERS, SIDEWALKS, OR OTHER IMPROVEMENTS.

_____ _____

SENECA COUNTY ENGINEER DATE

SENECA COUNTY ENGINEER'S CERTIFICATION (STORM)

HAVING INSPECTED THE STORM DRAINAGE SYSTEM WITHIN THIS PLAT, I FIND IT TO COMPLY WITH THE REQUIREMENTS OF THE SENECA WATER CONSERVATION DISTRICT AND TO BE ADEQUATE TO DRAIN THE LOTS, STREET AND OTHER PUBLIC AREAS WITHIN THE PLAT.

_____ _____

SENECA COUNTY ENGINEER DATE

SENECA COUNTY BOARD OF HEALTH

I HEREBY ACCEPT AND APPROVE THIS PLAT AS TO MEET THE MINIMUM REQUIREMENTS AND REGULATIONS THIS _____ DAY OF _____, 20___.

_____

HEALTH COMMISSIONER

SENECA COUNTY REGIONAL PLANNING CERTIFICATION

WE HEREBY ACCEPT AND APPROVE THIS PLAT AS SHOWN HEREON THIS _____ DAY OF _____, 20___.

_____

PRESIDENT, REGIONAL PLANNING COMMISSION

_____ TOWNSHIP TRUSTEES' AND / OR ZONING CERTIFICATION

WE HEREBY ACCEPT AND APPROVE THIS PLAT AS SHOWN HEREON THIS _____ DAY OF _____, 20___.

_____

_____

_____
TOWNSHIP TRUSTEES

SENECA COUNTY COMMISSIONERS' CERTIFICATION (PLAT)

IT IS HEREBY CERTIFIED THAT THIS PLAT WAS SUBMITTED TO THE BOARD OF SENECA COUNTY COMMISSIONERS ON THIS _____ DAY _____, 20___.

_____
CLERK OF COMMISSIONERS

THIS PLAT IS HEREBY APPROVED FOR APPROPRIATE RECORDING. THIS DOES NOT CONSTITUTE AN ACCEPTANCE OF THE DEDICATION OF ANY PUBLIC STREET, ROAD, OR HIGHWAY ON THIS PLAT (SECTION 711.041 O.R.C.) NOR ACCEPTANCE OF ANY STORM DRAINAGE OR SANITARY TREATMENT FACILITIES.

APPROVED:

_____ _____
DATE

_____

_____
SENECA COUNTY COMMISSIONERS

SENECA COUNTY COMMISSIONERS' ACCEPTANCE (CONSTRUCTION)

THE HOMEOWNERS ASSOCIATION SHALL BE EXCLUSIVELY RESPONSIBLE FOR MAINTENANCE OF ALL DRAINAGE WATER COURSES, DETENTION BASINS, AND EASEMENTS SO NOTED

WE DO HEREBY ACCEPT THE DRAINS AND STORM SEWER WITHIN PUBLIC EASEMENTS AND RIGHT-OF-WAY AS SHOWN ON THIS PLAT TO BE MAINTAINED IN ACCORDANCE WITH CHAPTER 6137 O.R.C. AND DO HEREBY APPOINT THE SENECA COUNTY ENGINEER TO BE “DITCH SUPERVISOR” FOR THIS PURPOSE AS PROVIDED IN SECTION 6137.06 O.R.C.

APPROVED:

_____ _____
DATE

_____

_____
SENECA COUNTY COMMISSIONERS

SENECA COUNTY AUDITOR'S CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAT WAS PRESENTED TO ME AND TRANSFERRED THIS _____ DAY OF _____, 20___.

_____
SENECA COUNTY AUDITOR

SENECA COUNTY RECORDER'S CERTIFICATION

FILED FOR RECORD THIS _____DAY OF _____, 20___, AT _____.
RECORDED THIS _____ DAY OF _____, 20___, IN PLAT CABINET _____, SLOT _____ RESTRICTIVE COVENANTS RECORDED OFFICAL RECORD _____ PAGE _____.

_____
SENECA COUNTY RECORDER

SURVEYOR'S CERTIFICATION

MONUMENTS MARKED THUS _____ WILL BE SET ON THE PERIMETER OF THE SUBDIVISION AFTER CONSTRUCTION. ALL OTHER CORNERS WILL HAVE A 5/8 INCH DIAMETER, CAPPED, IRON ROD SET AFTER CONSTRUCTION.

I HEREBY DECLARE THAT THE ABOVE DESCRIBED PROPERTY WAS SURVEYED IN _____, 20___. PROPERTY LINES SHOWN ARE LOCATED FROM DEEDS ON RECORD AND ARE DEED LINES. BEARINGS ARE ASSUMED AND FOR ANGULAR MEASUREMENTS ONLY. ALL INFORMATION SHOWN IS TO THE BEST OF MY KNOWLEDGE AND BELIEF AND MEET ALL CONVEYANCE REQUIREMENTS OF SENECA COUNTY.

_____ _____

SURVEYOR DATE

REGISTATION #_____

SENECA COUNTY SOIL AND WATER CONSERVATION DISTRICT

I HEREBY ACCEPT FOR MAINTENANCE ALL DRAINS AND SEWER LINES LOCATED ON PUBLIC DRAINAG EASEMENTS NOT INCLUDED IN ROAD RIGHT-OF-WAYS AS SHOWN ON THIS PLAT.

_____ _____

DISTRICT PROGRAM ADMINISTRATOR DATE

TOWNSHIP ZONING CERTIFICATION
(APPLICABLE TO ZONED TOWNSHIPS ONLY)

IT IS HEREBY CERTIFIED THAT THIS PLAT WAS SUBMITTED TO _____ TOWNSHIP ZONING INSPECTOR/BOARD AND THAT THE DEVELOPMENT AS SHOWN IS IN COMPLIANCE WITH ALL APPLICABLE TOWNSHIP ZONING REGULATIONS.

_____ _____

TOWNSHIP ZONING INSPECTOR DATE