

CHAPTER 35

Article I. Title. Street and Storm Water Management Design
and Construction Standards

Article II. Purposes.

2.1 Construction of public and private ways can have a major impact on municipal services, soil erosion, water quality, traffic congestion and future use of the abutting land. Therefore, the purpose of this ordinance is to promote public health, safety and welfare by establishing design and construction standards for both public & private ways.

Article III. Authority and Administration.

3.1 This ordinance is enacted pursuant to 30-A M.R.S.A., Section 3001 et. Seq.

3.2 The City Council shall administer these standards.

Article IV. Definitions. Except as specifically defined herein, all words in the ordinance shall carry their customary dictionary meanings.

Arterial Street:	A major thoroughfare serving as a major traffic way For travel within and through the city.
Collector Street:	A street serving at least fifteen (15) lots or dwelling units or a street which serves as feeder to arterial streets and collector of traffic from minor streets.
Construction:	Design and layout of any new proposed street.
Gravel:	Any material over approximately 1/8" and those particles less than 1/8" are sand & silt (pass through a #200 sieve).
Industrial/ Commercial Streets:	Streets servicing industrial and commercial uses * Including but not limited to industrial parks, shopping centers, etc.
Maintenance:	Repair of a street or section thereof to maintain its serviceability including, but not limited to brush cutting, ditching, grading, erosion control measures and storm water management, etc.
Major Maintenance:	Two or more activities up to 250 linear feet each side of road or up to 500 linear feet on one side.

*Requiring frequent tractor-trailer and delivery truck usage.

Minor Maintenance:	Any project not classified as major.
Minor Street:	A street serving less than fifteen (15) lots or dwelling units.
Municipal Officers:	City Council.
Private Way:	A road serving two or more structures over which neither the municipality nor the general public has the right to pass by vehicle or foot.
Public Easement:	An easement held by the municipality designating a way that the general public has a right of access by motor vehicle or foot but the municipality does not have the obligation to maintain.
Public Way:	An area or strip of land designated and held by a municipality for the passage and use of the general public by motor vehicle or foot.
Reconstruction:	Redesign, including but not limited to widening, extending, straightening, and layout of an existing street.
Repair:	Repair means to take necessary action to fix normal storm damage.
Road Gravel:	"Gravel," "sand" and "silt" in proper proportions to support traffic, shed water, resist abrasion and allow compaction.
Road Supervisor:	City Highway Foreman.
Street:	A public or private way including but not limited to alley, avenue, boulevard, highway, lane, roads and other rights-of-way.
Trip Generation:	The number of vehicle trips generated per day for a selected use.
Urban Compact Area:	The more densely developed area of the city as delineated by the Maine Dept. of Transportation.

Article V. Applicability.

- A. This ordinance shall apply to the construction, reconstruction and maintenance of all streets within the city.
- B. No street shall be accepted as a public way unless it has been constructed or reconstructed in accordance with this ordinance.
- C. The City Council may personally, or by their agency, construct or reconstruct any city street.
- D. The municipal officers may, upon the petition of any affected person, construct, reconstruct, and maintain a public street.
- E. The City Council may on petition therefore accept a public easement laid out by owners of land in the municipality if the land is connected to a public way.
- F. The City Council may discontinue a public way or public easement after they have given notice to all abutting property owners and the Municipal Planning Board and have filed an order of discontinuance with the Municipal Clerk. The Municipal Clerk must then record an attested Certificate of Road Discontinuance in the Registry of Deeds.

- G. Street classifications shall be determined by the City Council or by their agency based on trip generations.
- H. Reconstruction of Existing City Public Ways:
 - 1. Public ways reconstructed by the City shall be required to comply with the applicable road construction standards except as follows:
 - a. The City Council may approve a waiver for particular design standards when 1) existing right-of-way is insufficient to construct to the road standard, or 2) physical limitations such as existing encroaching buildings or steep grades make construction within the appropriate design standard impractical, or 3) when traffic volumes are <300 trips per day.
 - b. The minimum right-of-way width shall be that determined to be existing at the time of reconstruction.
 - c. The minimum travel way width shall be not less than twenty feet (20') edge of asphalt to edge of asphalt for rural public ways and twenty feet (20') curb to curb (including gutters) for public ways constructed within the urban compact area.
 - d. The shoulder width may be reduced to two feet (2') for existing rural collector and minor public ways.
 - e. Sidewalks within the urban compact area may be waived only when conditions 1) or 2) in H. (1) a. above are applicable. Sidewalk widths, when constructed, shall be not less than that required under federal or state law.
 - f. Maximum grade may be exceeded to allow the reconstruction of the public way within the existing right-of-way.
 - g. The pavement requirement may be waived for unpaved rural public ways if 1) traffic counts are determined by the city to be less than 300 trips per day and 2) the proposed road grade would not result in loss of road base or have an adverse environmental impact because of erosion.

- h. The decision of the City Council shall be based on the particular set of circumstances presented, shall not be precedent, and shall be final without appeal. No waiver shall be approved if such waiver would have a more adverse impact on public safety than the existing conditions. The City Council shall state the reasons for any approved waiver in their decision, which shall also be, recorded on the final road reconstruction plans.

Article VI. Legal State Provisions

A. Conflict With Other Ordinances.

- 1. Whenever the requirements of this ordinance are in conflict with the requirements of any other lawfully adopted rule, regulation, ordinance, the more restrictive requirements shall govern.
- 2. The Street Design and Construction Standards Ordinance in effect at the time that this ordinance is adopted is hereby repealed provided, however, that it shall remain in full force and effect with respect to any violation thereof in existence at the time of the adoption of this ordinance, and provided further that any such violation of the ordinance and subject to its terms and provisions.

B. Validity.

- 1. If any section, subsection, clause or phrase of this Ordinance shall be held to be invalid or unconstitutional, such invalidity shall not affect the remaining provisions of this ordinance and to that end the provisions of this ordinance are hereby declared to be severable.

C. Availability.

- 1. A certified copy of this ordinance shall be filed with the City Clerk and shall be accessible to any member of the public. Copies shall be made available to the public at reasonable cost and at the expense of the person making the request. Notice of availability of this ordinance shall be posted.

Article VII. General Requirements

- A. The Planning Board shall not approve any proposed street(s) * and storm water management systems unless they are designed and inspected in accordance with the specifications contained in these regulations.
- B. Prior to acceptance of a street(s) as a Public Way the City Council shall require detailed "as built" construction drawings showing a plan view, profile, and typical cross-section of the proposed streets* and existing streets within (200) feet of any proposed intersections prepared by a Professional Engineer. The plans shall include the following information:
 - 1. Date, scale, and magnetic or true north point.
 - 2. Intersection of the proposed street with existing streets.
 - 3. Roadway and right-of-way limits including edge of travel way, edge of shoulder, sidewalks, and curbs.
 - 4. Kind, size, location, material, profile and cross-section of all existing and proposed drainage structures and their location with respect to the existing natural waterways and proposed drainage ways.
 - 5. Complete curb data shall be indicated for all horizontal and vertical curves.
 - 6. Turning radii at all intersections.
 - 7. Centerline gradients.
 - 8. Locations of all existing and proposed overhead and underground utilities, to include but not be limited water, sewer, electricity, telephone, lighting and cable television.
- C. Upon receipt of plans for a proposed public street, the Planning Board shall forward one (1) copy to the City Highway Foreman for review and comment.
- D. When improvements are proposed by developer within existing public streets, the proposed design and construction details shall be approved in writing by the Highway Foreman or the Maine Dept. of Transportation, as appropriate.

* Proposed street(s) servicing four (4) or fewer lots may be prepared by a Professional Engineer or Land Surveyor.

Article VIII. Inspection.

- A. The City Council and/or Planning Board shall cause inspections to be made upon completion of the following:
 - 1. Preparation - clearing of right-of-way.
 - 2. Sub-base course.
 - 3. Aggregate base course.
 - 4. Storm water provisions.
 - 5. Completed project.

Article IX. Street Design.

- A. These design standards shall be met by all new streets including proposed streets within subdivisions, and shall control the roadway, shoulders, curbs, sidewalks, drainage systems, culverts, and other appurtenances, unless otherwise specified.
- B. Streets shall be designed to discourage through traffic on minor streets.
- C. Reserve strips controlling access to streets shall be prohibited except where their control is definitely placed with the municipality.
- D. Adjacent to areas zoned and designed for commercial use, or where a change of zoning to a zone which permits commercial uses is contemplated by the municipality, the street right-of-way and/or travel way width shall be increased on each side by half of the amount necessary to bring the street into conformance with the standards for commercial streets in these regulations.
- E. When a proposed street borders an existing narrow street (not meeting the width requirements of the standards for streets in these regulations), or when the comprehensive plan indicates plans for realignment for widening of a street that would require use of some of the abutting land, the plan shall indicate the reserved area to be deeded to the municipality or State.
- F. The following design standards apply according to street classification:

TYPE OF STREET

DESCRIPTION	ARTERIAL	COLLECTOR	INDUSTRIAL/ COMMERCIAL	MINOR	PUBLIC EASEMENT AND/OR PRIVATE WAY
Minimum Right-of-Way Width	66'	50'	66'	50'	50'
Minimum Travel Way Width	24'	22'	24'	20'	18'
Sidewalk Width*	5'	5'	5'	5'	N/A
Minimum Grade	0.50%	0.50%	0.50%	0.50%	0.50%
Maximum Grade**	6%	8%	6%	8%	10%
Minimum Centerline Radius	500'	230'	400'	150'	150'
Minimum Tangent Between Curves of Reverse Alignment	200'	100'	400'	50'	50'
Roadway Crown Paved Gravel	1/4" 1/2"	1/4" 1/2"	1/4" 1/2"	1/4" 1/2"	1/4" 1/2"
Minimum Angle of Street Intersections***	90	90	90	75	75
Maximum Grade Within 75 Ft. of Intersection	2%	2%	2%	2%	5%
Minimum Curb	30'	20'	30'****	15'	5'
Minimum R/O/W Raddii at Intersections	20'	10'	20'	10'	10'
Minimum Width of Shoulders	5'	3'	5'	3'	3'

* Required in urban compact area-curbs and gutters.

** Maximum grade may be exceeded for a length of 100 feet or less.

*** Street intersection angles shall be as close to 90 degrees as feasible but no less than 30 feet.

**** Should be based on turning radii of expected commercial vehicles, but no less than 30 feet.

As an alternative to the figures presented in **Type of Street** table, a street serving a cluster subdivision located within the City's Growth Area, as identified in the Ellsworth Comprehensive Plan; using City water and sewer; and generating a very low volume of traffic (less than 400 average daily trips), with a maximum speed limit of 25mph, may be proposed if designed by a Professional Engineer Registered in the State of Maine per the standards provided in the latest editions of the *Geometric Design of Highway and Streets* and *Guidelines for Geometric Design of Very Low Volume Local Roads* published by the *American Association of State Highway and Transportation Officials (AASHTO)*. Proposed street plans which include the use of alternative criteria shall be required to undergo an independent engineering review, paid by the applicant, to ensure the protection of the health, safety, and welfare of the residents of Ellsworth. Such street plan's Minimum Right-of-Way shall not be less than 50'.

- G. The centerline of the roadway shall be the centerline of the right-of-way.
- H. Dead End Street – Any dead-end streets more than 300 ft. in length shall be provided with a cul-de-sac at its terminus having no less than 120 ft. outside diameter of the traveled way. Both T & Y turnarounds are also acceptable. In lieu of a cul-d-sac, the City Council would require a minimum length of seventy feet on each leg of a "T" or "Y" turnaround at the end of dead-end street. The seventy-foot distance can start from the centerline of the street that is dead ending. The "T" or "Y" will need to meet the same construction standard as the proposed street.

Where the cul-de-sac is in a wooded area prior to development, a stand of trees shall be maintained within the center of the cul-de-sac. The Planning Board may require the reservation of a twenty (20) foot easement in line with the street to provide continuation of pedestrian traffic or utilities to the next street. The Planning Board may also require the reservation of a fifty (50) foot easement in line with the street to provide continuation of the street where future development is possible.

- I. Grades, Intersection and Sight Distances
 - 1. Grades of all streets shall conform in general to the terrain, so that cut and fill are minimized while maintaining the grade standards above.
 - 2. All changes in grade shall be connected by vertical curve in order to provide the following minimum stopping sight distances based on the street design speed.

Design Speed (mph)	20	25	30	35
Stopping Sight Distance (feet)	125	150	200	250

Stopping sight distance shall be calculated with a height of eye at 3.5 feet and the height of object at 0.5 feet.

2. Where new street intersections or driveway curb-cuts are proposed, sight distances, as measured along the street onto which traffic will be turning, shall be based upon the posted speed limit and conform to the table below. Sight distances shall be measured from the driver's seat of a vehicle standing on that portion of the exit with the front of the vehicle a minimum of ten (10) feet behind the curb line or edge of shoulder, with the height of the eye 3 1/2 feet to the top of an object 4 1/2 feet above the travel way.

Design Speed (mph)	25	30	35	40	45	50	55
Stopping Sight Distance (feet)	250	300	350	400	450	500	550

Where necessary, corner lots shall be cleared of all growth and sight obstructions, including ground excavation, to achieve the required visibility.

4. Cross (four-cornered) street intersections shall be avoided insofar as possible, except as shown on the comprehensive plan or at other important traffic intersections. A minimum distance of two hundred (200) feet shall be maintained between centerlines of side streets.
- J. Sidewalks - Where installed, sidewalks shall meet these minimum requirements.
1. Bituminous Sidewalks:
 - a. The crushed aggregate base course shall be no less than eight (8) inches thick.
 - b. The hot bituminous travel way surface course shall be no less than two (2) inches after compaction.

2. Concrete Sidewalks:

- a. The sand base shall be no less than six (6) inches thick.
- b. The concrete shall be reinforced with six (6) inch square, number ten (10) wire mesh and shall be no less than four (4) inches thick.

K. Granite curbing shall be installed on a thoroughly compacted gravel base of six (6) inches minimum thickness. Bituminous curbing shall be installed on the base course of the travel way. The specified travel way width above shall be measured between the curbs.

Article X. Street Construction Standards

- A. Maine Dept. of Transportation recommended standards.
- B. Minimum thickness of material after compaction.

STREET MATERIALS

DESCRIPTION	ARTERIAL	COLLECTOR	INDUSTRIAL/ COMMERCIAL	MINOR	PUBLIC EASEMENT AND/OR PRIVATE WAY
Aggregate Sub-Base Course (Max. Sized Stone 4")	18"*	18"*	24"*	18"*	18"*
Crushed Aggregate Base Course	4"	3"	4"	3"	3"

*Recommend it be placed in 2"-9" lifts & compacted.

HOT BITUMINOUS PAVEMENT

DESCRIPTION	ARTERIAL	COLLECTOR	INDUSTRIAL/ COMMERCIAL	MINOR	PUBLIC EASEMENT AND/OR PRIVATE WAY
Total Thickness	3"	3"	3"	3"	
Surface Course	1"	1"	1"	1"	
Base Course	2"	2"	2"	2"	

C. Preparation.

1. Before any clearing has started on the right-of-way, the centerline and sidelines of the new street shall be staked or flagged at fifty (50) foot intervals.
2. Before grading is started, the entire right-of-way shall be cleared of all stumps, roots, branch, and other objectionable material. All ledge, large boulders, and tree stumps shall be removed from the right-of-way.
3. All organic materials shall be removed to a depth of two (2) feet below the sub grade of the roadway. Rocks and boulders shall also be removed to a depth of two (2) feet below the sub grade of the roadway. On soils, which have been identified as not suitable for roadways, the subsoil shall be removed from the street site to a depth of two (2) feet below the sub grade and replaced with material meeting the specifications for gravel aggregate sub-base below.
4. Except in a ledge cut, side slopes shall be no steeper than a slope of three (3) feet horizontal to one (1) foot vertical, and shall be graded, loamed, limed, fertilized, and seeded according to the specifications of erosion and sedimentation control plan. Where a cut results in exposed ledge, a side slope no steeper than four (4) feet vertical to one (1) foot horizontal is permitted.
5. When underground utilities are proposed they shall be installed prior to paving to avoid cuts in the pavement. Building sewers and water service connections shall be installed to the edge of the right-of-way prior to paving.

D. Bases and Pavement

1. Bases

- a. The Aggregate Sub-base Course shall be sand or gravel of hard durable particles free from vegetative matter, lumps or balls or clay and other deleterious substances. The gradation of the part that passes a three (3) inch square mesh sieve shall meet the following grading requirements.

<u>SIEVE DESIGNATION</u>	<u>% BY WEIGHT PASSING SQUARE MESH SIEVES</u>
1/2 inch	45-70%
1/4 inch	30-55%
# 40	0-20%
#200	0-05%

Aggregate for the base shall contain no particles of rock exceeding 2" in any dimension.

- 2. Pavement Joints: Where pavement joins an existing pavement, the existing pavement shall be cut along a smooth line and form a neat, even vertical joint.
- 3. Curbs and Gutters: Curbs and gutters shall be installed within the urban compact area, or within any areas designated in the Capital Improvements Plan or Comprehensive Plan as areas of compact development.
- 4. Pavements.
 - a. Minimum standards for the base layer of pavement shall be the Maine Department of Transportation specifications for plant mix grades B with an aggregate size no more than one (1) inch maximum.
 - b. Minimum standards for the surface layer of pavement shall meet the Maine Department of Transportation specifications for plant mix grade C with an aggregate size no more than 3/4-inch maximum.

Article XI. Storm Water Management Design Standards

- A. Adequate provision shall be made for disposal of all storm water generated, and any drained groundwater through a management

system of swales, culverts, under-drains, and storm drains. The storm water management system shall be designed to conduct storm water flows to existing watercourses or storm drains.

- B. Where a street is traversed by a stream, river, or surface water drainage-way, or where the Planning Board feels that surface water runoff to be created should be controlled, there shall be provided easements or drainage rights-of-way with swales, culverts, catch basins or other means of channeling surface water. This storm water management system shall be designed by a Registered Professional Engineer.
- C. Drainage easements for existing water courses or proposed drainage ways shall be provided at least thirty (30) feet wide, conforming substantially with the lines of existing natural drainage.
- D. All components of the storm water management system shall be designed to limit peak discharge to predevelopment levels for every storm between the 2-year and the 25-year, 24-hour duration, frequencies, based on rainfall data for Bangor, Maine. When the discharge is directed to a major water body, peak discharge may not be increased from predevelopment levels unless downstream drainage structures are suitably sized.
- E. The minimum pipe size for any storm drainage pipe shall be twelve (12) inches. Maximum trench width at the pipe crown shall be the outside diameter of the pipe plus two (2) feet. Pipe shall be bedded in a fine granular material, containing no stones larger than three (3) inches, lumps of clay, or other organic matter, reaching a minimum of six (6) inches below the bottom of the pipe extending to six (6) inches above the top of the pipe.
- F. The storm water management system shall be designed to accommodate upstream drainage, taking into account existing conditions and approve for planned developments not yet built and shall include a surplus design capacity factor of twenty-five (25) percent for potential increases in upstream runoff.
- G. The storm drainage shall not overload existing or future planned storm drainage systems downstream.
- H. Catch basins shall be installed where necessary and located at the curb line.

- I. Outlets shall be stabilized against soil erosion by stone riprap or other suitable materials to reduce storm water velocity. Wherever the storm drainage system is not within the right-of-way of a public street, perpetual easements shall be provided to the City allowing maintenance and improvement of the system.
- J. Where soils require a subsurface drainage system, the drains shall be installed and maintained separately from the storm water drainage system.

Article XII. Storm Drainage Construction Standards.

- A. Materials.
 - 1. Reinforced Concrete Pipe: Reinforced concrete pipe shall meet the requirements of ASTM Designation C-76 (AASHTO M 170). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.2 on the .01-inch crack strength with a Class B bedding. Joints shall be of the rubber gasket type meeting ASTM Designation C 443-70, or an approved performed plastic joint material such as "*Ramnek*". Perforated concrete pipe shall conform to the requirements of AASHTO M 175 for the appropriate diameter.
 - 2. Asbestos Cement Pipe: Asbestos cement pipe shall meet the requirements of ASTM Designation C-428 (AASHTO M 189). Pipe classes shall be required to meet the soil and traffic loads with a safety factor of 1.5 of the crushing strength. Joints shall be of the rubber gasket type meeting ASTM Designation D-1869-63, or of an approved preformed plastic sleeve type.
 - 3. Corrugated Metal Pipe: Corrugated metal pipe shall be bituminous coated meeting the requirements of AASHTO Designation M 190 Type C for iron or steel pipe or AASHTO Designation M 1996 for aluminum alloy pipe for sectional dimensions and type of bituminous coating. Pipe gauge shall be as required to meet the soil and traffic loads with a deflection of not more than five (5) percent.
 - 4. ABS Pipe: ABS (Acrylonitrile-butadiene-styrene) composite pipe and fittings shall conform to the requirements of AASHTO M 265. Perforated pipe shall conform to the requirements of AASHTO M 36, Type III.

5. Corrugated Plastic Pipe: Corrugated plastic pipe shall conform to the requirements of AASHTO M-252.
 6. Manholes: Manholes shall be a precast concrete truncated cone section construction meeting the requirements of ASTM Designation C 478 or precast concrete manhole block construction meeting the requirements of ASTM Designation C 139, radial type. Bases may be cast in place 3,000 psi 28 day strength concrete or may be of precast concrete, placed on a compacted foundation of uniform density. Metal frames and traps shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTO M 105, Class 30 for gray iron castings or AASHTO M 183 (ASMT A 283, Grade B or better) for structural steel.
 7. Catch Basins: Catch basins shall be of precast concrete truncated cone section construction meeting the requirements of ASTM Designation C 478 or precast concrete manhole block construction meeting the requirements of ASTM Designation C 139, radial type. Castings shall be square cast iron sized for the particular inlet condition with the gratings perpendicular to the curb line. Bases may be cast in place 3,000 psi 28 day strength concrete or may be of precast concrete, placed on a compacted foundation of uniform density. Metal frames and traps shall be set in a full mortar bed and with tops shall conform to the requirements of AASHTO M 103 for carbon steel castings, AASHTO M 183 (ASTM A 283, Grade B or better) for structural steel.
- B. Drain inlet alignment shall be straight in both horizontal and vertical alignment unless specific approval of a curvilinear drain is obtained in writing from the City Council, after consultation with the Municipal City Highway Foreman.
- C. Manholes shall be provided at all changes in vertical or horizontal alignment and at all junctions. On straight runs, manholes shall be placed at a maximum of four hundred (400) foot intervals.
- D. Upon completion each catch basin or manhole shall be cleaned of all accumulation of silt, debris or foreign matter and shall be kept clean until final acceptance.

Article XIII. Additional Improvements and Requirements.

- A. Erosion Control: The procedures outlined in the erosion and sedimentation control plan shall be implemented during the site preparation, construction, and clean-up stages.
- B. Cleanup: Following street construction, a thorough cleanup of stumps and other debris from the entire street right-of-way shall be made. If on-site disposal of the stumps and debris is proposed, the site shall be indicated on the plan, and be suitably covered with fill and topsoil, lined, fertilized, and seeded.
- C. Street Names, Signs and Lighting: Streets, which join and are in alignment with streets of abutting or neighboring properties shall bear the same name. Names of new streets shall not duplicate, nor bear phonetic resemblance to the names of existing streets within the municipality, and shall be subject to the approval of the City Council. No street name shall be the common given name of a person. The developer shall reimburse the municipality for the costs of installing street name, traffic safety, and control signs. Street lighting shall be installed as approved by the Council.

Article XIV. Certification of Construction.

- A. *"As built"* plans shall be submitted to the City Manager. Upon completion of construction and prior to a vote by the City Council to accept a proposed public way, a written certification signed by a Professional Engineer registered in the State of Maine shall be submitted to the City Council certifying that the proposed way meets or exceeds the design and construction standards.

A TRUE COPY:

ATTEST: _____
HEIDI-NOËL GRINDLE