Chapter A300

ENGINEERING STANDARDS

[HISTORY: Adopted by the Village Board of the Village of Fall Creek 5-9-1996. Amendments noted where applicable.]

GENERAL REFERENCES

Special assessments -- See Ch. 104.
Building construction and fire prevention -- See Ch. 118.
Sewers -- See Ch. 214.
Streets and sidewalks -- See Ch. 227.
Water -- See Ch. 254.
Subdivision of land -- See Ch. 267.

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§ A300-1. Improvements.

Improvements required to be furnished shall be constructed in accordance with the following standards and specifications. Improvements shall also be placed in accordance with other applicable village ordinances. All work shall be subject to periodic inspection by the village or its authorized representative at the subdivider's expense.

§ A300-2. Surveying.

All surveying shall be completed in accordance with W.S.A. Ch. 236.

§ A300-3. Streets.

A. Cross-section elements. (See Appendix.)

(1) Street width. Residential (minor) streets shall be constructed 36 feet wide measured from the face of the curb to the face of the opposite curb. Arterial and collector streets shall be constructed with a minimum of 42 feet, face of curb to face of curb. In areas where new streets join other streets of different width, appropriate transitions shall be made to match the existing street width.

(2) Pavement cross slopes. Typical pavement cross slopes shall be 0.02 foot per foot. A minimum cross slope of 0.015 foot per foot and a maximum cross slope of 0.04 foot per foot may be used.

(3) Boulevard cross slopes. Typical boulevard cross slopes shall be 0.04 foot per foot. A minimum cross slope of 0.02 foot per foot and a maximum cross slope of 0.06 foot per foot may be used.

(4) Curb type. Thirty-inch concrete curb and gutter shall be used on all edges of pavement. See the Appendix for typical curb details for roadway and driveway sections.

(5) Pavements. Typical pavement types and thicknesses are as follows: granular

subbase shall be placed on top of compacted subgrade and shall be 18 inches thick. Crushed aggregate base course shall be placed on top of granular subbase and shall be eight inches thick. Asphaltic concrete pavement shall be placed on top of crushed aggregate base course and shall consist of two layers of 1 ½ " thick asphaltic concrete, for a total thickness of 3". In the event that exceptional quality subgrade is encountered, the thickness of granular subbase may be lessened with approval of the Village Engineer. These pavement thicknesses are typical of residential streets. For roads serving nonresidential areas, thicker pavement sections may be required.**[Amended 4-12-04, 3-08-2010]**

(6) Subgrade stabilization. A geotextile fabric suited for subgrade stabilization and soil separation shall be used on all streets. This requirement may be waived on streets with exceptional quality subgrade.

B. Rights-of-way. All streets shall have a minimum right-of-way width of 66 feet. Greater road widths may be required by the Plan Commission and the Village Board if in their opinion traffic volumes, planned function of the street and character of the planned abutting land uses warrant greater widths. The right-of-way diameter of culs-de-sac shall be 120 feet.

C. Profile elements.

(1) Minimum slope. The minimum slope on all streets with curb and gutter shall be 0.50%.

(2) Maximum slope. The maximum slope on an arterial street shall be 5.0%. The maximum slope on a collector street shall be 7.0%. The maximum slope on a minor street shall be 8.0%. The maximum driveway slope within a right-of-way shall be 10%.

(3) Vertical curve standards. Different connecting street gradients shall be connected with vertical curves. Minimum length, in feet, of these curves shall be 20 times the algebraic difference in the percent of grade of the two adjoining slopes.

D. Alignment elements.

(1) Intersections. No more than two roads shall meet at an intersection. Intersecting streets should meet at an angle of 90°. If this is not possible, then the least angle permitted shall be 60°. Radii at residential intersections shall be 15 feet measured from the back of the curb. Industrial and commercial curb radii shall be determined on a case-by-case basis. Vision triangles shall be observed at all intersections in accordance with the illustrations found in Chapter 268, Zoning, of this Code. Sight easements with minimum tangent distances of 30 feet shall be provided at street intersections.

(2) Horizontal curves.

(a) Horizontal curves shall be provided at intersections if the deflection angle of the through street is greater than 7°. Horizontal curves shall be provided on roadways if the deflection angle is greater than 3°.

(b) The minimum center-line radius of 150 feet shall be applied to curved streets. Street jogs shall have a center-line offset of 150 feet or more when applied to minor streets or service streets; in all other cases they shall be avoided. On minor roads, variances may be granted by the Village Engineer. A tangent length of 100 feet shall be provided between curves of reverse direction.

(3) Culs-de-sac. The maximum length of cul-de-sac streets shall be 500 feet measured along the center line from the intersection of origin to the end of the right-of-way. The minimum radius to the face of curb and gutter shall be 45 feet. The right-of-way radius shall be 60 feet.

§ A300-4. Sidewalks.

A. General (see detail in Appendix).[1]

(1) Typically sidewalks shall be placed so that the back of the walk is located 1.0 feet from the right-of-way line on both sides of the street.

(2) The sidewalk in a residential district shall be a minimum of 4’ (four feet) in width and not less than 4” (four inches) thick, with a minimum thickness of 6” (six inches) at driveway locations.

(3) The sidewalk in front of commercial and industrial establishments shall be a minimum of 8’ (eight feet) in width and not less than 4” (four inches) thick, with a minimum thickness of 6” (six inches) at driveway locations. **[Amended 9-10-2012]**

B. Cross slope. A cross slope of 0.04 foot per foot shall be used on sidewalk. The sidewalk shall be tipped with the lower edge facing towards the road.

C. Joints. Transverse joints shall be placed every 4’ (four feet) in the sidewalk. One-half-inch transverse expansion joint filler shall be placed through the sidewalk at uniform intervals not exceeding 96’ (ninety-six feet).

D. Curing. Concrete sidewalks shall be cured by the wet fabric method, the impervious coating method or the paper method. The curing technique chosen shall conform to Wisconsin Department of Transportation requirements.

E. Pedestrian ramps. Pedestrian ramps shall be constructed on all new or replacement sidewalk that is placed within 5’ (five feet) of a legal crosswalk.

F. Subgrade requirements. Sidewalks shall be placed on six inches of granular subbase. The granular subbase shall extend horizontally 0.50 feet beyond the edges of the sidewalk.

§ A300-5. Driveway entrances.

The maximum width of a driveway entrance shall be 24’ (twenty-four feet). The minimum width of a driveway entrance shall be 12’ (twelve feet). (See detail in Appendix.)

[1] Editor's Note: Amended at time of adoption of Code (see Ch. 1, General Provisions, Art. I).

§ A300-6. Stormwater drainage.

A. Design.

(1) Return periods. Stormwater drainage systems shall be sized based on the following return periods: ten-year full flow; twenty-five-year hydraulic check; and one-hundred-year overland flow route.

(2) Design report. A design report showing the calculations used to size the stormwater drainage system shall be submitted to the Village Engineer.

B. Minimum sizes. Minimum size of storm sewer pipe shall be 12" (twelve inches). Yard drains with smaller diameters may be approved on a case-by-case basis.

C. Inlet location. As a general rule, stormwater should be collected at radius points on intersections and not allowed to travel through an intersection.

D. Underdrains. Underdrain pipe shall be used in areas where impervious subgrade is found. The underdrains shall be connected to adjacent inlets where grade allows for the connection.

E. Materials.

(1) Reinforced concrete pipe. Reinforced concrete pipe shall conform to the requirements of AASHTO Designation M170 for the class of pipe specified. The placement of the reinforcement shall comply with the provisions of AASHTO Designation M170. Provide Tracer Wire on all non-metallic pipe. **[Amended 5-13-2019]**

(2) Composite pipe. Composite pipe, couplings, fittings and joint materials intended for use for storm sewers shall conform to the requirements of the specification for ABS or PVC composite sewer piping, ASTM Designation D2680. Provide Tracer Wire on all non-metallic pipe. **[Amended 5-13-2019]**

(3) High-density polyethylene pipe. Smooth interior corrugated pipe in nominal sizes from 12 inches to 36 inches shall meet the requirements of AASHTO M294. Push-on watertight fittings shall be used with high-density polyethylene (HDPE) pipe. Provide Tracer Wire on all non-metallic pipe. **[Amended 5-13-2019]**

(4) Castings. Castings for inlets at curbs shall be Neenah R-3067 or equal. Castings for storm sewer manholes shall be Neenah R-1642 or equal.

(5) Storm manholes. Manholes shall have a minimum inside diameter of 48 inches. Inlets shall be 36 inches by 24 inches, standard. Both inlets and manholes shall be precast concrete.

§ A300-7. Sanitary sewer.

A. Design. A sanitary sewer shall be designed according to Chapter NR 110 of the Wisconsin Administrative Code. Sewer service shall be provided to all residential lots.

B. Pipe material. PVC pipe and fittings furnished shall meet the requirements of ASTM D-3034, SDR 35 pipe. Provide Tracer Wire on all non-metallic pipe. **[Amended 5-13-2019]**

C. Manholes.

(1) Precast concrete manholes shall be used. The minimum inside diameter of manholes shall be 48 inches.

(2) Butyl rubber gaskets shall be required at section joints. A minimum of two adjusting rings and a maximum of six adjusting rings shall be utilized.

(3) Integral pipe water-stop boots are required at all pipe openings.

D. Manhole castings. Manhole castings shall be Neenah R-1642-B or equal.

E. Service laterals. Service laterals shall be extended seven feet beyond the right-of-way line. This is done so the sidewalk is not disturbed when a plumber makes a connection.

F. Pressure sewer. Pressure sewer shall be installed in accordance with the Developer Information and User Information policy statements and the Typical Indoor Grinder Pump and Typical Outdoor Grinder Pump details included in the Appendix. Provide Tracer Wire on all non-metallic pipe. **[Added 10-8-2012, 5-13-2019]**

§ A300-8. Water main.

A. Design. Water distribution systems shall be designed in accordance with Chapter NR 811 of the Wisconsin Administrative Code. Water supply shall be provided to all residential lots.

B. Pipe materials, general.

(1) Polyvinyl chloride pipe. Pipe shall meet the requirements of AWWA C-900, SDR 18, Pressure Class 150. Joints shall conform to ASTM D3139 and ASTM F477. Provide Tracer Wire on all non-metallic pipe. **[Amended 5-13-2019]**

(2) Ductile iron pipe. Pipe shall meet the requirements of the AWWA with a minimum pressure rating of 350. All ductile iron pipe shall have a bituminous exterior coating and an interior cement mortar lining.

C. Hydrants. Hydrants shall meet the requirements of AWWA C-502 and shall be tested, approved and listed with Underwriters' Laboratories, Inc. Fire hydrants shall be Waterous Company Pacer WB67. **[Amended 4-8-2013]**

D. Valves. All gate valves shall be mechanical joint resilient-seated gate valves for 200 pounds per square inch working pressure, 400 pounds per square inch test pressure. The valve shall have a two-inch nonrising operating nut which shall open counterclockwise.

E. Valve boxes. All valve boxes shall be cast iron conforming to ASTM Designation A-48, Class 20. The castings shall be thoroughly coated with a minimum one-millimeter thickness of bituminous coating. The valve box shall be a three-piece, screw-type box, 51/4 inches.

§ A300-9. Service connections.

A. Corporation stops. Corporation stops shall be manufactured in accordance with AWWA Specification C-800 and ASTM B-62. The stop shall be Mueller, Pattern H-15008 or equal.

B. Curb stops. Curb stops shall be manufactured in accordance with AWWA Specification C-800 and ASTM B-62. The stop shall be Mueller H-15155 or equal, with a Minneapolis top thread for connection with the curb box.

C. Curb box. Curb boxes shall be extension type for Minneapolis pattern curb stops, 3/4 inch to two inches. Stationary rods shall be provided with the curb box.

D. Service piping. The water service piping shall be copper tubing, Type K, conforming to ASTM Designation B-88.

E. HDPE Water services requirements. All High Density Polyethylene (HDPE) pipe furnished under these specifications shall be ¾" (three-fourth inch) through 2" (two inch) and conform to AWWA C901, ASTM D2737 and NSF 14 & 61. The pipe shall be blue with a clear core, SDR 9, CTS, 200 psi and produced with PE 3408 resin. HDPE water tubing shall only be used in outdoor, buried applications. Provide Tracer Wire on all non-metallic pipe. **[Amended 4-8-2013, 5-13-2019]**

Appendix: Standard Details

SEE CODE BOOK

DEVELOPER INFORMATION PRESSURE SEWER

PRESSURE SEWER

Fall Creek will consider the use of low-pressure sewer systems where the developer demonstrates that pressure sewer is cost-effective compared to a conventional gravity system or offers overriding environmental benefit. For both types of systems, the Village will operate and maintain only that portion of the system within the public street or easement.

COST-EFFECTIVE ANALYSIS

The developer's engineer shall prepare a cost-effective analysis comparing gravity sewer to pressure sewer. The analysis shall include both the cost of the sewer in the public street and the private sewer including the grinder pump. Estimated power and maintenance costs shall be included. Environmental benefits such as reduced disturbance of steep hillsides may also be considered. The Village must concur with the selection of pressure sewer before design proceeds.

DESIGN REQUIREMENTS

Complete hydraulic calculations demonstrating flow and head conditions at both initial (1st year) and fully developed conditions shall be prepared. Pressure sewer mains shall be SCR 11 HDPE. Laterals to single-family users shall be $1^{1/4}$" HDPE. Provide a $1^{1/4}$" curb stop and box at the property line. Connect to the pressure sewer main in the street with a fused HDPE tee. Install all pipes with a 7 ft. minimum cover. Provide approved flushing connections at deadends, changes in pipe size, changes in direction and at intervals no greater than 1,000 ft. Depending on the length of the system and number of connections, special odor-control methods or equipment may be required at the discharge. All construction shall meet DNR requirements. Grinder pumps shall be furnished, installed and maintained by the user. Individual grinders for each single-family unit shall be provided except where multiple living units are under common ownership. The user shall also install the lateral and make connection to the curb stop at the public street. Where a lateral stub and curb stop were not provided during initial construction, the user shall install the lateral to the main within the street as well as a curb stop at the property line. Only approved grinder pump units with redundant check valves are permitted to be connected to the Village sewer system. The user's sewer system and grinder pump shall be protected from clear water entry, including flood waters. No open sewer fixtures or grinder pump unit cover shall be located lower than 2 ft. above the 100-year flood elevation.

NOTICE TO PURCHASER

It is the seller's responsibility to provide notice to the purchaser about the Village policies related to connection to pressure sewers.

USER INFORMATION PRESSURE SEWER

PRESSURE SEWER
The sanitary sewer system serving your area is a pressure system rather than the more conventional gravity flow system. Each connection to the pressure system requires the use of a special grinder pump which you must furnish and install. Please proved these specifications to your plumber. Equipment, materials and installation of your sewer connection must comply with all state and local codes and these specifications.

GRINDER PUMP
Proved an Environment/One Model DH071 or other approved Environment/One (E/One) unit. These units are U.L. listed simplex, semi-positive displacement sewage grinder pumps units with integral automatic controls housed in a 29.5" diameter polyethylene basin with a sealed cover. Include a $1^{1/4}$" redundant check valve, $1^{1/4}$" ball-type shut off valve, $1^{1/4}$" schedule 40 PVC discharge pipe with pressure rated fittings and $1^{1/4}$" PVC union. Refer to the attached installation sketches. The grinder pump unit also includes an alarm/disconnect panel to be installed by an electrician. Duplex units are available for larger users. Other brands of packaged, positive displacement grinder pump systems will be considered but require written approval by the Village.

LATERAL
The pressure lateral shall be $1^{1/4}$" SDR 11 HDPE with a minimum of 7 ft. cover. Connect to the stubbed service pipe near the property line.

FLOOD PROTECTION
No open sewer fixture or grinder pump unit cover shall be located lower than 2 ft. above the 100-year flood elevation. Ballast will be necessary to prevent floatation.

TESTING
The grinder pump station shall be started up and the operation verified by a factory trained service technician. All piping including the lateral shall be pressure tested with water at 60 psi for 60 minutes with no pressure drop. After successful pressure testing, use clean water at a 5 GPM interruptable fee rate to simulate at least 3 pump cycles. The Village Sewer Department shall be notified at least 48 hours in advance to witness testing.