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5 ROAD SYSTEM

Follow AASHTO guidelines unless otherwise noted. Street designs shall be consistent with the City's adopted Comprehensive Plan. All local roadways shall be posted at 25 mph and have a design speed of 30 mph. Private roads must be designed in accordance with public road standards, even in PUD's.

5.1 GEOMETRICS

5.1.1 RIGHT-OF-WAY WIDTHS

Type	Minimum ROW Width (feet)
Local Street	66
Local Street (R-6 Zoning District)	60*
Manufacturing and Industrial	80
Collectors and arterials	Per adopted County Highway Width Map and/or Official City Map.

Note: Zoning Code Section 275-33D(18) was added during the 1/12/2016 Zoning Code amendment.

* Per Zoning Code Section 275-33 D (18), *in the R-6 District, the Plan Commission and Common Council may approve sixty (60) foot right-of-way widths where determined acceptable by DCD.*

5.1.2 PAVEMENT WIDTHS

5.1.2.1 Pavement widths are measured from edge of pavement to edge of pavement.

standard urban residential section using curb and gutter	24 feet
standard rural residential section with open ditches	28 feet
standard commercial or industrial section	40 feet

5.1.3 BOULEVARD SECTIONS

5.1.3.1 Entrance

- *Minimum pavement width (flange to flange of curb and gutter) shall be 16 feet for a single lane.*
- *Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet for a double lane.*

5.1.3.2 Exits

- *Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet (double lane).*

5.1.3.3 Minimum median width shall be 8 feet back of curb to back of curb.

5.1.3.4 Median length shall be adequate for queuing, but generally shall not extend beyond the first side street.

5.1.4 CUL-DE-SACS

5.1.4.1 Local streets open at one end only shall end with a cul-de-sac.

5.1.4.2 No less than 3 parcels and no more than 15 parcels may be served by a cul-de-sac. Block length between intersections shall not exceed 1,500 feet nor be less than 500 feet. Block length is measured from the center line of the right-of-way to the center line of the right-of-way of the two cross streets.

5.1.4.3 Residential:

- *All pavement widths for a standard residential cul-de-sac shall have a minimum bulb radius of 42 feet as measured from the center of the cul-de-sac to the edge of pavement.*
- *The minimum bulb radius for the Right-of-Way shall be 66 feet as measured from the center of the cul-de-sac.*

5.1.4.4 Commercial or Industrial:

- *All pavement widths for a standard commercial or industrial cul-de-sac shall have a 45-ft. radius measured from the center of the cul-de-sac to the edge of pavement.*
- *The minimum radius for the Right-of-Way shall be 66 feet.*

5.1.4.5 Central planting islands are acceptable in the middle of the cul-de-sac.

- *Minimum pavement width (edge of pavement to edge of pavement for rural cross-section or flange to flange for curb and gutter) shall be 16 feet for a single lane.*
- *Plantings should be installed outside of the 5' clear zone for snow plowing.*

5.1.5 CLOSE/LOOP STREET

5.1.5.1 The close or loop street, may be used in lieu of a short cul-de-sac, and shall be designed as two parallel lanes, 16-ft. wide lanes separated by a central planting strip or bio-retention area having a minimum width of 50 feet.

5.1.5.2 Maximum length for a close or loop street shall be 1,000 feet.

5.1.6 STREET GRADES

Type	Max Grade
Arterial	4 %
Collector	7 %
Local	10 %

5.1.6.1 Urban roadway sections shall have a minimum 0.7% centerline profile gradient.

5.1.7 CROSS SLOPE

5.1.7.1 All roadway sections (urban or rural) shall have a crown, with a cross slope of 3% from the pavement centerline to the edge of pavement.

5.1.8 HORIZONTAL CURVES

5.1.8.1 Minimum horizontal curve requirements, per AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.8.2 **Compound Curves**

5.1.8.2.1 Compound curves are only allowed on roads with a posted speed limit of 25 mph or less.

5.1.8.2.2 A minimum horizontal curve radius of 250 feet is required along the roadway centerline.

5.1.8.2.3 A horizontal curve radius of 200 feet may be accepted when a 100' long tangent length is provided between curves.

5.1.9 VERTICAL CURVES

5.1.9.1.1 Maintain "K" Values per AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.10 SIGHT DISTANCE

5.1.10.1 For minimum sight distance requirements at intersections and driveways, refer to AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.11 CORNER RADII

5.1.11.1 Internal to development for minor streets (measured from the edge of pavement/flange line):

- *Residential and multi-family: 25 feet*
- *Commercial and industrial: 42 feet*

5.1.11.2 Corner radii at intersections to external roadways, shall be as approved by the City Engineer.

5.1.12 ACCELERATION/DECELERATIONS/BYPASS LANES

5.1.12.1 Any roadway intersecting with a collector or arterial street projected to have more than 100 ADT shall require Acceleration/Decelerations/Bypass Lanes per Detail Figure No. 4.

5.1.13 TRANSITIONS

5.1.13.1 Transitions areas, such as lane additions, bypass lanes, traffic shifting lanes, and areas between existing pavement and new pavement sections with varying widths, shall be transitioned at a ratio of 15:1 (widen 1 foot in 15 feet).

5.2 SPECIFICATIONS

These standards shall apply to all public and private roadways. Any and all modifications to these Specifications must be approved by the City Engineer.

5.2.1 SUBGRADE

5.2.1.1 DESIGN STANDARDS

5.2.1.1.1 Soil borings to a minimum depth of 10 feet below finish grade shall be taken every 500 feet along the proposed centerline of the roadway. A site map showing the location of the borings along with laboratory soils classifications for each boring shall be submitted to the City Engineer.

5.2.1.1.1.1 Should the geotechnical data submitted to the City not be sufficient to satisfy the City Engineer, the Developer shall grant the City with a right of entry to obtain the required data. Costs associated with obtaining the required data shall be at the Developer's sole expense.

5.2.1.2 INSTALLATION

5.2.1.2.1 The subgrade must be proof rolled, checked for proper grade and approved by the City Engineer or designee before the geotextile fabric and crushed stone base is to be applied.

5.2.1.2.2 All earth fills under roadways shall be placed in 12" maximum lifts and a Proof Roll shall be approved by the City Inspector.

5.2.1.2.3 All soft spots located as a result of proof rolling with a fully loaded tri-axle truck approved by City Engineer or designee shall be undercut, and filled in a manner agreed upon by the Contractor and the City Engineer.

5.2.1.2.4 All repaired soft spots shall be re-proof rolled after subgrade elevation has been re-established. Process shall be repeated until the project passes proof roll.

5.2.1.2.5 In unstable soil conditions, undercutting in excess of 3' shall be backfilled with 3" TB or breaker run or other materials as approved in writing by the City Engineer.

5.2.1.2.5.1 If open graded material is used, drainage at the bottom of the undercut is required by use of a French drain or perforated pipe bedded in crushed stone, where grades allow. In many situations, dense graded coarse TB shall be used to eliminate water that would be trapped if clear stone was used.

5.2.1.2.6 In unstable soil conditions, additional subdrains may be required as directed by the City Inspector.

5.2.1.2.7 Method of drainage of the filled area shall be approved by the City Inspector.

5.2.1.2.8 Geotextile fabric shall be installed on all roadways. Type based on field conditions per WisDOT.

5.2.2 GEOTEXTILE FABRIC

5.2.2.1 MATERIAL

5.2.2.1.1 Geotextile fabric conforming to WisDOT Standard Specification, Section 645 shall be pre-approved by the City Engineer prior to installation for :

- *subgrade separation and stabilization (Type SAS)*
- *drainage filtration (Type DF)*
- *subgrade reinforcement (Type SR)*
- *under riprap (Types R & HR).*

5.2.2.2 INSTALLATION

5.2.2.2.1 Geotextile fabric shall be placed on the subgrade on all areas that will receive crushed aggregate base course material, unless a Clear Stone Frost Barrier is to be used. Geotextile fabric is not required where Clear Stone Frost Barrier is to be used.

5.2.2.2.2 Geotextile fabric shall have a minimum 24” overlap for longitudinal seams and minimum 36” overlap for transverse seams.

5.2.2.2.3 Subsequent open cuts of the pavement requiring excavations below the subgrade of roadways having geotextile fabric in place shall be backfilled with approved compacted granular fill up to original subgrade elevation. Pavement and base shall be removed a minimum 6” on each side of excavation or extent of damaged fabric to allow new geotextile repair fabric to be installed with a minimum 6” overlap on all sides.

5.2.3 BASE COURSE

5.2.3.1 MATERIALS

5.2.3.1.1 The crushed aggregate base course for the roadway shall consist of dense graded base conforming to WisDOT Standard Specification Section 305.2.2.1 for 1 ¼-inch.

5.2.3.2 INSTALLATION

5.2.3.2.1 The finished base course elevation shall be a minimum of:

- *8" above the approved subgrade for a local roadway,*
- *14.5" above the approved subgrade for a commercial or industrial roadway*

5.2.3.2.2 The dense graded base shall be spread, shaped, compacted, and proof-rolled to produce a stabilized base which conforms to the required cross-sections.

5.2.3.2.3 Special compaction testing may be required dependent on site conditions in accordance with 301.3.4.3 of the WisDOT Standard Specifications.

5.2.4 FROST BARRIER

5.2.4.1 MATERIALS

5.2.4.1.1 The Frost Barrier shall be #3 Clear Stone with a minimum depth of 12" or as specified for a given project.

5.2.4.2 DESIGN STANDARDS

5.2.4.2.1 Where specified by the City, a layer of Clear Stone Frost Barrier shall be required to prevent or minimize future frost heave damage to the roads.

5.2.5 SHOULDERS

5.2.5.1 MATERIALS

5.2.5.1.1 The aggregate for shoulder shall consist of :

- *Crushed stone conforming to WisDOT Standard Specification Section 305.2.2.1 for ¾-inch dense graded base; or*
- *Recycled asphalt as approved by the City Engineer.*

5.2.5.2 DESIGN STANDARDS

5.2.5.2.1 For rural cross sections, a 3-ft. wide shoulder shall be constructed along both edges of pavement.

5.2.6 ASPHALT PAVEMENT

5.2.6.1 MATERIALS

5.2.6.1.1 Asphalt pavement materials shall conform to the requirements of WisDOT Standard Specification Section 460. Asphaltic concrete shall be PG 58-28 or PG 64-22.

5.2.6.1.2 When a “Superpave” mix design is proposed to be used, the Contractor must submit the mix design and receive the approval of the City Engineer two weeks prior the preconstruction conference. The following applies:

	Binder			Surface		
	Mix Design	Aggregate	Thickness	Mix Design	Aggregate	Thickness
residential streets	E-3	19 mm	3” (one lift)	E-1	12.5 mm	2”
commercial and industrial	E-3	19 mm	4” (two lifts)	E-3	12.5 mm	2”

5.2.6.1.2.1 Mix designs for all other classifications shall be as approved by the City Engineer.

5.2.6.1.2.2 Mix designs are anticipated to change in 2016. Follow the WisDOT mix design at that time.

5.2.6.2 **INSTALLATION**

5.2.6.2.1 All asphalt binder courses shall be constructed on a substantially surface-dry, rolled and compacted crushed stone base, free of loose and foreign materials. Hand operated vibrating compactors shall be used around all manholes and valve boxes.

5.2.6.2.2 A tack coat, meeting the requirements of WisDOT Standard Specification Section 455.2.5, shall be used as a bonding agent between binder and surface courses, and the separate lifts of binder when not placed on the same day. The binder surface shall be thoroughly cleaned and any vegetation removed prior to applying the tack coat. Tack coat shall be uniformly applied at a rate of 0.05 gallon per square yard with an allowable variation of +/- 0.02 gallon per square yard over the entire receiving surface. Daily application of the tack coat shall be limited to approximately that area of surface that can reasonably be expected to be paved during the same day.

5.2.6.2.3 Sawcutting

5.2.6.2.3.1 When sawcutting existing concrete or asphalt pavements, curb and gutter, driveways, or sidewalks, the saw cut shall be straight, and shall be full depth.

5.2.6.2.3.2 No payment shall be made for sawing that is not straight or for sawing where the sawing debris is not washed off of the pavement or driveways that are open to traffic.

5.2.6.2.4 Longitudinal joints in the surface course shall at no time be placed immediately over similar joints in the binder course beneath, with the exception of the centerline. A minimum distance of 6” shall be required between the location of the joints in any given course and the location of similar joints in the course placed above it.

5.2.6.2.5 Paving shall be done in lengths so that the first pass does not cool below 125° F, prior to second pass of the next lane.

5.2.6.2.6 Any asphalt paving after October 1st of any year shall be done only with special, alternate methods approved by the New Berlin City Engineer.

5.2.6.2.7 If the roadway will not receive the final lift prior to October 1st, a minimum 18" wide wedge of asphalt shall be placed against the curb and gutter for protection.

5.2.6.2.8 On roadways with rural cross-section, the edge of the pavement shall be sloped and no materials shall extend beyond the limits of the previous layer. Irregularities in alignment along the outside edges shall be corrected by adding or removing asphalt. Excess asphalt deposited on the existing base, binder or surface course outside the limits of the lane being laid, shall be immediately removed.

5.2.6.2.9 Prior to placement of the surface course:

5.2.6.2.9.1 All foreign matter shall be removed from the binder course surface.

5.2.6.2.9.2 On streets with curb and gutter, the 18" wide wedge of protective asphalt previously placed against the curb and gutter shall be removed.

5.2.6.2.9.3 Developer/Contractor, at his sole expense, shall repair any depressions or other signs of failure in the binder course as directed by the City Engineer.

5.2.6.2.9.4 Developer/Contractor, at his sole expense, shall repair any damaged curb and gutter as directed by the City Engineer.

5.2.6.2.9.5 All manhole rims and water valve boxes shall be left 3/8" –1/2" below binder course and adjusted to 3/8" –1/2" below the final pavement elevation just prior to placement of surface course of asphalt. Paving rings which have an adjustable diameter are not allowed.

5.2.6.2.10 All excavations associated with manhole adjustments shall be backfilled with aggregate slurry as specified in Standard Specification for Sewer and Water Construction in Wisconsin Section 8.43.8. The aggregate slurry shall be backfilled to 5-inches below final pavement elevation for residential streets and 6-inches below the final pavement elevation for commercial and industrial streets.

5.2.6.2.11 Asphalt pavement installation will not be permitted after October 1st unless approved by the City Engineer.

5.2.6.2.11.1 Asphaltic binder course shall not be installed after September 1st, unless approved by the City Engineer.

5.2.6.2.11.2 Asphaltic surface course shall be installed in the same calendar year as the binder course, unless approved by the City Engineer.

5.2.7 CONCRETE PAVEMENT

The use of concrete pavement requires the approval of the City Engineer.

5.2.7.1 **MATERIALS**

5.2.7.1.1 Portland Cement used in all concrete mixes shall conform to WisDOT Standard Specification Section 501.

5.2.7.1.2 Aggregates used in concrete shall conform to the requirements of WisDOT Standard Specification Section 501.

5.2.7.1.3 Concrete shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

- *Minimum concrete content, 6.0 sacks per cubic yard;*
- *Compressive strength after 28 days cured: 3,500 psi;*
- *Maximum amount of water per bag of cement: 6.0 gallons;*
- *Size of course aggregates required: No. 1 plus No. 2;*
- *Slump: 1"-3"; and*
- *Air content: 4.5% - 7.5%.*

5.2.7.2 **DESIGN STANDARD**

Local streets	Non-Reinforced	7"
All other streets	Doweled	8"

5.2.7.2.1.1 Alternative designs shall be as approved by the City Engineer.

5.2.7.3 **INSTALLATION**

5.2.7.3.1 Contractor must submit a mix design and receive the approval of the City Engineer prior to paving.

5.2.7.3.2 A pre-pour meeting must be scheduled with the Engineering Division prior to paving to discuss materials and joint locations.

5.2.7.3.3 Water used shall conform to WisDOT Specification Section 501.2.4. If City water is used, it will be charged at the current rates for such use; a PERMIT IS REQUIRED from the Water Utility for any City water use.

5.2.7.3.4 The consistency of the freshly mixed concrete shall be such that when measured by means of a 4" x 8" x 12" slump cone, the slump shall not exceed 3".

5.2.7.3.5 Test cylinders shall be required meeting AASHTO standards, stored under site conditions and then tested at Contractor expense.

5.2.7.3.6 Concrete pavement shall be constructed in accordance with WisDOT Standards Specifications, Section 415.

5.2.7.3.7 Curing Time and Cleanup

5.2.7.3.7.1 Concrete pavements shall be closed to all traffic for 7 days unless otherwise directed by the City Engineer. When directed to open the street to vehicular traffic, the Contractor shall clean the area of all forms, lumber, dirt and other debris to the satisfaction of the City Engineer. The Contractor shall then flush and sweep the street.

5.2.7.3.7.2 When a concrete saw has been utilized to cut joints, the Contractor will be required to flush the pavement with water, removing all residual materials of the sawing operation, prior to opening the street to vehicular traffic.

5.2.7.3.8 Concrete Placement During Cold Weather

5.2.7.3.8.1 Concrete shall not be placed on a frozen subgrade. The Contractor shall remove and replace at his expense any concrete damaged by frost or freezing.

5.2.7.3.8.2 When placing concrete during cold weather, the water and the aggregates in the concrete mixture may be heated. When specifically allowed by the City Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

5.2.7.3.8.3 When the air temperature is expected to drop below freezing, the Contractor shall cover the surface of the concrete with straw or hay to a sufficient depth to prevent freezing and such protection shall be furnished for at least 5 days after the concrete has been poured. Other methods of protection from freezing may be used when approved by the City Engineer.

5.2.8 ADMIXTURES

5.2.8.1 **Water Reducing**

The Contractor may incorporate into the concrete mixture an approved water reducing admixture meeting the requirements of AASHTO Specification M-194, Type A or D when approved by the City Engineer. The cement content may be reduced to 5.8 sacks per cu. yd. when the admixture is used at the manufacturer's recommended rate.

5.2.8.2 **Accelerator**

When specifically allowed by the City Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

5.2.9 CURB AND GUTTER

5.2.9.1 **MATERIALS**

5.2.9.1.1 All concrete curb construction shall conform to WisDOT Standard Specification, Section 601.

5.2.9.1.2 Concrete for curbs shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

- *Minimum concrete content: 6.0 sacks per cubic yard;*
- *Compressive strength after 28 days cured: 3,500 psi;*
- *Size of course aggregates required: No. 1;*
- *Slump: 1"- 3"; and*
- *Air content: 4.5% - 7.5%.*

5.2.9.1.3 Concrete that is rejected on the work site for any reason shall not be re-tempered and used in the work without specific approval of the City Engineer.

5.2.9.1.4 Concrete Curb and Gutter shall be a standard 6" vertical face curb and gutter type that is 30" wide (6" top curb and 24" flange), 9½" deep at the flange and 14" deep at the back of curb.

5.2.9.1.5 A V-Bottom mountable curb and gutter type that is 30" wide, 9" deep at the flange and 12" deep at the back of curb may be allowed at the discretion of the City Engineer, on local streets only.

5.2.9.1.6 Where connection is made to existing curb, dowels are required. Dowels conforming to WisDOT Standard Specification Section 505.2.6, shall be installed per WisDOT Standard Specification Section 416.3.6.

5.2.9.2 **DESIGN STANDARDS**

5.2.9.2.1 Minimum curb grade: 0.7 % (along the gutter flow line).

5.2.9.3 **INSTALLATION**

5.2.9.3.1 Before the concrete is placed, the crushed aggregate base course under the curb and gutter shall be checked for correct elevation.

5.2.9.3.2 The concrete shall be placed in as nearly a continuous operation as possible.

5.2.9.3.3 Prior to applying curing material on the concrete, the face of the curb shall be "branded" with a "W" designating the location(s) of water services, "S" designating the location(s) of sanitary laterals and "SS" for storm sewer laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

5.2.9.3.4 The concrete surface shall be sealed, directly after finishing operations, by spraying a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface.

5.2.9.3.5 Transverse contraction joints for curbs shall be cut or sawed at a maximum 10-foot intervals. One inch expansion joints shall be provided at ends of radii, points of considerable change in grade and alignment, at intervals not to exceed 300 feet and where abutting existing curb and gutter.

5.2.9.3.6 Concrete curb and gutter shall cure a minimum of 4 days prior to backfilling and crushed stone base installation.

5.2.9.3.7 Four days after the curbs have been placed and the City has approved the concrete work, the Contractor shall immediately backfill behind the curbs to preclude any erosion or undermining.

5.2.10 ROAD UNDERDRAIN PIPE

5.2.10.1 MATERIALS

5.2.10.1.1 A continuous 4" diameter perforated, corrugated polyethylene drain pipe, meeting the requirements of AASHTO Designation: M-252, shall be installed under the curb and gutters and extend 50 feet in either direction from storm water catch basins located at low points. For catch basins in other locations, the 50-ft. drain pipe shall be connected only to the upstream side.

5.2.10.1.2 Pipe perforations may be holes or slots and may be in 3 or 4 lines spaced around the circumference of the pipe at 120° or 90° respectively. The end of the drainage pipe opposite the catch basin shall be capped with a cap suitable for installing on the drainage pipe.

5.2.10.1.3 Enough geotextile fabric must be provided as to cover the sides and bottom of the trench and overlap across the top of the trench by a minimum of 4 inches or the pipe in a sock may be used, see Detail Figure No. 7.

5.2.10.1.4 The trench shall be backfilled with open graded ¾" clear stone.

5.2.10.2 INSTALLATION

5.2.10.2.1 The 4" drainage pipe shall be laid in an 8" deep by 8" wide trench with flat bottom with square sides. The trench, constructed at an elevation lower than the base course, shall be aligned with the proposed centerline of the flange of the curb and gutter. Any damaged drain pipe shall be replaced before the open graded stone is backfilled in the trench.

5.2.11 DRIVEWAYS

5.2.11.1 DESIGN STANDARDS

5.2.11.1.1 Driveway approaches are to be constructed by removing existing curb and gutter and installing poured in-place concrete. This activity requires a Driveway Approach Permit issued by the City.

5.2.11.1.2 Driveway slopes shall not exceed 10%.

5.2.11.1.3 Driveway slopes shall not exceed 5% in all areas within 25 feet of a building.

5.2.11.1.4 For commercial, industrial and multi-family buildings, if the initial 25 feet of driveway is deemed to be an accessible passenger loading zone, the American Disabilities Act (ADA) requires accessibility routes with longitudinal slopes of not greater than 5% and cross slopes of 2% to be connected to the loading zone and the accessible building entrance.

5.2.11.1.5 AASHTO Sight Distance requirements shall be required at all driveway locations.

5.2.11.2 RESIDENTIAL DRIVEWAYS

5.2.11.2.1 Only one driveway is allowed per parcel for residential developments.

5.2.11.2.2 For multi-family developments, the Plan Commission may grant one or more additional access points, based on the size of the development.

5.2.11.2.3 All residential driveways along roadways with vertical face curb and gutter and sidepath shall be constructed with a driveway apron.

5.2.11.3 COMMERCIAL DRIVEWAYS

5.2.11.3.1 The number of commercial driveways shall be the minimum necessary to provide reasonable access for regular traffic and emergency vehicles, while preserving operations and safety along the public roadway. Unless a Traffic Impact Analysis (TIA) shows that a single driveway cannot provide this, only one driveway access will be permitted unless one or more of the following conditions are met.

- *The continuous frontage of the parcel is over 300 feet long, in which case an additional driveway per each 300 feet or frontage may be granted by the Plan Commission.*
- *Two one-way driveways may be permitted along frontage of at least 150 feet provided the driveways do not interfere with operations at other driveways or along the street.*
- *The Plan Commission may determine additional driveways are justified due to the amount of traffic generated by the use without compromising traffic operations along the public street.*

- *All commercial driveways along roadways with vertical face curb and gutter shall be constructed with a minimum of a driveway apron. Certain locations with heavy amounts of traffic will need to use a street type entrance as directed by the City Engineer.*

5.2.11.4 **INSTALLATION**

5.2.11.4.1 The concrete surface shall be sealed, directly after finishing operations, with a uniform coating of curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface.

5.2.11.4.2 Concrete driveway approaches shall be a minimum of 7" thick.

5.2.11.4.3 Asphalt driveway approaches shall be a minimum of 3" thick.

5.2.11.4.4 The modification of the curb and gutter and the construction of the driveway approach shall be done in accordance with the driveway approach permit.

5.2.11.4.5 Concrete curb and gutter shall not be saw cut horizontally at driveways. Reconstruction of the curb and gutter is required.

5.2.11.4.6 Expansion joint material, ½" thick for full depth of concrete, shall be placed between the curb and gutter and the approach. Dowels shall be required at the joints between existing curb and new curb.

5.2.12 PARKING LOTS

(The Reader is referred to Zoning Code Section 275-57 for additional Parking Lot Standards)

5.2.12.1 Off street parking lots shall be designed to accommodate traffic volumes and pedestrian circulation based on the land use served.

5.2.12.2 The internal circulation pattern shall be designed with 24-ft. wide driving aisles (measured from edge of pavement marking to edge of pavement marking) for two-way traffic to allow users to maneuver in an efficient & safe manner.

5.2.12.3 The use of landscaped islands & medians shall be used to provide positive guidance to motorist and establish proper driving patterns.

5.2.12.4 Sidewalks adjacent to parking stalls shall be 8 feet wide. Smaller sidewalks may be allowed with prior City approval. Appeals may be made to the Plan Commission.

5.2.12.5 Turning radii for a single unit truck (SU Design Vehicle) shall be provided as a minimum to all portions of the lot.

5.2.12.6 Pavement:

- *General parking areas are recommended to have at least a minimum of 8-inches of crushed aggregate base course and 4-inches of E-3 Asphaltic Concrete.*
- *Areas of heavy traffic, such as loading docks, shall have at least a minimum of 10-inches of crushed aggregate base course and 6-inches of E-3 Asphaltic Concrete.*

5.2.12.7 Inverted parking lots are discouraged.

5.2.13 SIDEPATHS AND TRAILS

5.2.13.1 MATERIALS

5.2.13.1.1 Concrete for sidepaths shall be air entrained, Grade A, conforming to WisDOT Standard Specifications, Section 501, meeting the following requirements:

- *Minimum concrete content, 6.0 sacks per cubic yard;*
- *Compressive strength after 28 days cured: 3,500 psi;*
- *Maximum amount of water per bag of cement: 6.0 gallons;*
- *Size of course aggregates required: No. 1 plus No. 2;*
- *Slump: 1"-3"; and*
- *Air content: 4.5% - 7.5%.*

5.2.13.1.2 Sidepaths are to be constructed of 5-inches of concrete over a 4-inch crushed aggregate base course.

5.2.13.1.3 Driveway crossings shall be 7-inches of concrete over a 6-inch crushed aggregate base course.

5.2.13.1.4 Trails shall be constructed of an E-0.3 "Superpave" mix asphalt 3-inches thick over a 5-inch crushed aggregate base course or as directed by the City Engineer.

5.2.13.2 DESIGN STANDARDS

5.2.13.2.1 Current and future planned sidepath and trail locations are identified in the City's *Comprehensive Plan*. Any development that occurs on or adjacent to these locations is required to connect to, or construct its portion of the system, if not currently in place, or provide detailed rationale and request a waiver from the Plan Commission and/or Common Council

5.2.13.2.2 Sidepaths shall be separated from the street by a minimum 6-foot wide grassy terrace with shade trees.

5.2.13.2.3 The outside edge of sidepaths shall be located 1-foot from the right-of-way line or as directed by the City Engineer except at intersection crossings. At intersection crossing, the proper placement shall be determined by the location of the crosswalk and as directed by the City Engineer.

5.2.13.2.4 Width of Sidepath:

Local Roads	5 feet
Collectors and Arterials	6 feet

5.2.13.2.5 Trails shall be a minimum of 10 feet wide with 1 foot of gravel shoulder on both sides and in conformance with AASHTO's Guide for the Development of Bicycle Facilities.

5.2.13.2.6 Traverse grade of 2% (1/4" per foot) draining toward the road.

5.2.13.2.7 The maximum allowed longitudinal grade shall be 5%. This grade shall not be exceeded unless the road grade is of a steeper grade, in which case the longitudinal sidewalk grade shall not exceed the road grade.

5.2.13.3 **INSTALLATION**

5.2.13.3.1 Sidewalk shall be placed by formed methods.

5.2.13.3.2 Contraction joints shall be not less than ¼" wide and ½" deep. Contraction joint spacing shall be 5' or as directed.

5.2.13.3.3 Expansion joints shall be located at a minimum 100 ft O.C. Finished joints shall have ¼" radius. After floating, troweling, and jointing, the concrete shall be brushed with a damp bristle brush.

5.2.13.3.4 The concrete surface shall be sealed, directly after finishing operations, with a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface.

5.3 INSPECTION

Contractor shall be responsible for the horizontal and vertical control.

5.3.1 ACCEPTANCE TESTING

5.3.1.1 **Tests**

5.3.1.1.1 Prior to the installation of stone base, or sub-base, the subgrade shall be proof rolled with a fully loaded tri-axle truck. Proof rolling shall be scheduled with the City Inspector.

5.3.1.1.2 The subgrade shall be inspected before the crushed stone base may be applied. This inspection is done by the City Inspector or its contracted inspection services. An average tolerance of +/- 0.04-ft. from the approved subgrade elevation shall be allowed.

5.3.1.1.3 The base course shall be inspected and approved by the City Inspector before the first layer of asphalt can be placed. An average tolerance of +/- 0.04-ft. from the approved base course thickness shall be allowed. Additional proof rolling of base course may be required if, in the opinion of the City Inspector, conditions have changed.

5.3.1.1.4 A City Inspector shall be present for the placement of all-concrete curb and gutter. This includes the inspection of the base under the curb and gutter, and a check of the alignment and grade of the curb and gutter.

5.3.1.1.4.1 Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the City Engineer or designee.

5.3.1.1.4.2 Curb and gutter elevations will be considered acceptable if certified elevations are within ¼" of design elevations.

5.3.1.1.4.3 If evidence indicates that there is standing water in the gutter flange, that portion of the curb and gutter shall be reconstructed to establish positive drainage.

5.3.1.1.5 A City inspector shall be present whenever any asphalt pavement is being constructed.

5.3.1.1.5.1 Asphalt to be placed on a roadway, shall arrive at the job site at a temperature of 275° F +/- 25° F. The asphalt inspector will periodically test the temperature of the arriving trucks for the temperature of the asphalt. Any trucks not falling within the guidelines for asphalt temperatures shall be rejected. Paving shall not be done at temperatures below 40 degrees F.

5.3.1.1.5.2 Both the binder course and the surface course shall be compacted to not less than 91.5% maximum density. Contractor shall have testing done by an independent Lab unless otherwise approved.

5.3.1.1.5.3 An average tolerance of +/- 0.04-ft. for the binder thickness and +/- 0.04-ft. from the approved final pavement surface elevation shall be allowed.