CITY OF WEST BEND ENGINEERING DEPARTMENT
GUIDELINES FOR SUBDIVISION FACILITIES PLAN REVIEW
AND ADMINISTRATION OF PRIVATE DEVELOPMENT PROJECTS

This is an update of the guidelines used by the City Engineer when reviewing plans for proposed public improvements in the City of West Bend. These guidelines are provided to assist the Developer and his Engineer in the design of public improvements in private developments in the City, as well as the City Engineer in the administration of the construction of those improvements.

Variances from the design guidelines will be considered if valid justification for the variance is submitted in writing at the time of the review.

These guidelines are meant to supplement the Standard Specifications of the City of West Bend. They shall not be construed as being all inclusive since project conditions may dictate the need for additional design considerations.

If followed, these guidelines should assist the Developer and his Engineer in the development of all information required by the City Engineer to review the plans submitted, to expedite the review process, and to minimize redesign prior to final approval, as well as provide an aid to understanding other requirements related to the construction of the proposed facilities.

In any case where there is a conflict between the provisions in this document and the Standard Specifications of the City of West Bend, the Standard Specifications shall supersede this document.

ABBREVIATIONS USED IN TEXT

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
BM	Benchmark
CAD	Computer Aided Design
CB	Catch basin – inlet with a sump
CB/MH	Catch basin manhole
C/L	Center Line
DCD	Department of Community Development (City of West Bend)
DI	Ductile Iron
DNR	Department of Natural Resources (State of Wisconsin)
DOT	Department of Transportation (State of Wisconsin)
DPW	Department of Public Works (City of West Bend)
Dia	Diameter
Elev.	Elevation
EX.	Existing
FDM	Facilities Development Manual (DOT)
GIS	Geographic Information System
ID	Identification – as in MH ID being MH "B"
I.E.	Invert Elevation
INL	Inlet
INV	Invert
MH	Manhole
MUTCD	Manual on Uniform Traffic Control Devices
N, E, S, W	North, East, South, West
NGVD 1929	National Geodetic Vertical Datum 1929
N.R.C.S.	Natural Resources Conservation Service (Formerly Soils Conservation Service or S.C.S.)
P.C.	Point of Curvature
PROP.	Proposed
P.T.	Point of Tangency
P.V.C.	Point of Vertical Curvature (profiles) or Polyvinyl Chloride (pipe)
P.V.I.	Point of Vertical Intersection
P.V.T.	Point of Vertical Tangency
P.H.C.	Point of Horizontal Curvature
P.H.I.	Point of Horizontal Intersection
P.H.T.	Point of Horizontal Tangency
R.C.P.	Reinforced Concrete Pipe
R.O.W. or R/W	Right-of-Way
R.W.V	Resilient Wedge Valve
SEWRPC	Southeastern Wisconsin Regional Planning Commission
Sta. or STA	Station
S.W.M.	Storm Water Management
SWMP	Storm Water Management Plan (or Permit)
Wis	Wisconsin
WM	Water Main
U.S.G.S.	United States Geological Survey

GENERAL PROCEDURE

(Submission to Final Approval)

The following is a summarized version of the subdivision development process. A more in depth description of the subsequent procedures is found through-out the Subdivision Guidelines.

The process of subdivision development shall begin with the submittal of a plan to the Department of Community Development and initial meetings with DCD staff (contact DCD or view the Community Development page of the City website for complete procedures).

The Developer should submit **to the Engineering Department,** both a Storm Water Management Plan (if required) and Construction Plans (Road and Utility) for review and eventual approval at the same time his development plans are submitted to DCD.

After the approval of the Storm Water Management Plan and the Road and Utility Construction Plans (each requiring separate approval), but prior to actual construction, a preconstruction meeting shall be held. The Developer may proceed with construction after the preconstruction meeting has taken place and once approved to proceed by the City Engineer.

An item requiring City acceptance may be placed on the agenda for meetings of the Board of Public Works and Common Council upon written request by the Developer once the improvement has been constructed (by the Developer), inspected (by the City), tested (by the City and/or Developer), inspection fees have been paid, and as-built plans have been submitted by the Developer and approved by the City. Following acceptance by the Council, a one year warranty from the date of the Council meeting for said item shall be upheld by the Developer.

PLAN SUBMITTAL

Prior to Plan submittal the Developer, or his representative, may request a pre-design meeting to discuss the proposed development and the following guidelines so that both the City Engineer and the Developer's Engineer are aware of the needs of the project. While a pre-design meeting is not required, it may help to expedite the review and minimize the need for revisions to the plans.

We recommend that approval of the Storm Water Management Permit is obtained before the submittal of Construction Plans. All grading is based on the approved SWMP. If grading changes are required for approval of the SWMP then the Construction Plan must also change. The Storm Water Permit Checklist can be found in the appendix and the following web site: the Engineering page of the City website, http://www.ci.west-bend.wi.us

REFERENCES

The following references were used in the development of these guidelines. The consultant should review them as they relate to the planned development and these guidelines.

- City of West Bend Municipal Code
  Website: http://www.ci.west-bend.wi.us/
  - Subdivision Code (Chapter 18)
  - Zoning Code (Chapter 17)
  - Erosion Control Code (Chapter 22)
  - Storm Water Management Code (Chapter 23)
  - Plumbing Code (Chapter 15)
- City of West Bend Standard Specifications for Public Works Construction, Latest Edition
  Website: the Engineering page of the City website

- Paragon (West Bend online Mapping and GIS site)
  Website: the GIS (Paragon) page of the City website
- AASHTO Guidelines
- Wisconsin Department of Transportation Facilities Development Manual
- Wisconsin State Statutes (Sanitary Sewer and Water Extensions, etc.)

STORM WATER MANAGEMENT PLANS

Application and Initial Fees

The application for Storm Water Management Permit Application can be picked up from the Engineering Dept.(3rd floor, City Hall) or on the internet at the following website: the Engineering page of the City website. The initial application fee for Storm Water Management Permit Review is $50.00.

Once the applications are completed and the fees are paid the review process may commence.

Review Time

The normal plan review period will be a minimum of one (1) week from the time of receipt of the plans. Larger or more complicated plans will take longer to review.

Storm Water Management Plan Submittals

In addition to the application and initial fees, the Developer or his Engineer shall submit:

- One (1) copy of the Storm Water Management report including calculations and topographic plans of the existing and proposed conditions showing the paths chosen for the time of concentration calculations.
- Two (2) copies of the site plan or grading plan for the proposed conditions featuring the existing and/or proposed storm sewer system.
- One (1) copy of inlet capacity computations.

Revised Plans

The number of sets of revised plans to be submitted following each review, until all concerns are addressed and the plans are formally approved, is the same as noted above for each type of plans unless otherwise noted on the review comment letter.

ROAD AND UTILITY CONSTRUCTION PLANS

Application and Initial Fees

The application for Development Plan Review Application can be found in the appendix, picked up from the Engineering Dept (3rd floor, City Hall) or on the internet at the following website: the Engineering page of the City website. The initial application fee for Development Plan Review is $100.00.

Once the applications are completed and the fees are paid the review process may commence.

Review Time

The normal plan review period will be a minimum of two (2) weeks from the time of receipt of the plans. Review of revised plans will usually require the same minimum review period.

The review period allows personnel from other city departments, (Fire Department, Public Works, Sewer and Water Utilities) to comment on the design submitted. This review is vital to assure future acceptance by the City of the constructed improvements. The City Engineer will act as the clearing house for the multi-departmental review of plans for public improvements and thus save time for the Developer's representative by eliminating the need for separate meetings with representatives of each of the affected departments.

It is the Developer's responsibility to coordinate scheduling of design, review, and other elements of the project so these functions do not adversely affect his project. The Developer and his Engineer should allow sufficient time for plan reviews when scheduling their design work and submissions.

The following plans and information shall be submitted to the City Engineer for review and approval prior to construction. The Engineering Department will be the clearing house for the City and will dispatch the plans to other reviewers as needed. Each set of plans submitted for review shall include a letter outlining the improvements to be reviewed and any other information that may assist the City Engineer.

Construction Plan Submittals

In addition to the application and initial fees, the Developer or his Engineer shall submit:

Five (5) complete sets of plans bearing the stamp of a professional Engineer licensed by the State of Wisconsin:

- Two (2) for the Engineering Department
- One (1) for the Sewer Utility
- One (1) for the Water Utility
- One (1) for the Department of Public Works

Plus:

Two (2) copies of sanitary sewer and water design data (DNR Sewer and Water Extension permit forms)
One (1) copy of other design data developed for the project
One (1) copy of Utility System Plan showing the water main for the Fire Department
One (1) copy of Landscaping Plan

Revised Plans

The number of sets of revised plans to be submitted following each review, until all concerns are addressed and the plans are formally approved, is the same as noted above for each type of plans unless otherwise noted on the review comment letter.

Final Approved construction Plans

When final plans are approved, six (6) additional complete sets of plans bearing the seal of a professional engineer licensed by the State of Wisconsin shall be furnished prior to construction. Additional complete sets may be required for the City's inspectors.

CAD Files

In addition, the Developer shall provide the City with digital CAD files of the construction plans. Those files shall include all proposed improvements shown on the paper copy of the construction plans, and at least one section corner and other information needed to insert the files into the City's GIS database. Details of file format, method of transmission and information needed, will be worked out between the Developer and the City Surveyor.

DESIGN GUIDELINES

SANITARY SEWER

Phasing

In case of phasing for project construction, each phase shall stop at a MH. No plug or cap will be allowed to end a buried pipe at the end of a phase. This is to facilitate line cleaning. If a stub exists at a manhole from an earlier phase, the stub shall be removed to the manhole and the new pipe shall be laid starting at the manhole.

Main

Size

- Minimum eight (8) inch diameter
- Submit basis of design including sizing of main, and, after City approval, a copy of any correspondence with attachments which were submitted to SEWRPC and DNR

Minimum Pipe Slopes for Design of Sanitary Sewers

(All slopes are shown as % or feet per 100 feet)

Minimum design slope for various lengths of pipe runs

Pipe Diameter (inches)	Length of pipe run (feet)					
	1 to 50	50 to 100	100 to 150	150 to 200	200 to 250	Over 250 Feet
8 (high dead end)	0.850	0.725	0.683	0.663	0.655	0.600
8	0.750	0.625	0.583	0.563	0.555	0.500
10	0.530	0.405	0.363	0.343	0.335	0.280
12	0.470	0.345	0.303	0.283	0.275	0.220
15	0.400	0.275	0.233	0.213	0.205	0.150
18	0.370	0.245	0.203	0.183	0.175	0.120
21	0.350	0.225	0.183	0.163	0.155	0.100
24	0.330	0.205	0.163	0.143	0.135	0.080
27	0.317	0.192	0.150	0.130	0.122	0.067
30	0.308	0.183	0.141	0.121	0.113	0.058
33	0.302	0.177	0.135	0.115	0.107	0.052
36	0.296	0.171	0.129	0.109	0.101	0.046
39	0.291	0.166	0.124	0.104	0.096	0.041
42	0.287	0.162	0.120	0.100	0.092	0.037

Material

- PVC (non white, must be blue or green)

Location

- Indicate distance from edge of curb flange to centerline of pipe, if less than five (5) feet.

- The minimum distance allowed is equal to the diameter of the pipe plus thirty (30) inches. If pipe depth is greater than ± nine (9) feet, additional clearance will be required.
- Minimum horizontal separation with water main: Ten (10) feet (centerline to centerline) is preferred. Eight (8) feet separation may be allowed in limited locations on a case by case basis.

Plug
- The discharge end of the proposed sewer main shall be plugged in the receiving manhole prior to the start of work. Said plug shall remain in place until the line has been formally accepted by the City, at which time the Developer or his Contractor shall be responsible for removing the plug.

Manholes

Type
- Pre-cast reinforced concrete

Size
- Four (4) foot diameter or five (5) foot diameter if required by pipe size, or quantity of pipes. Other oversized manholes to be detailed on plans.

Depth
- ± Nine (9) feet or greater depending on basement elevations and adjoining area to be served.
- If less than five (5) feet deep, a flat top manhole shall be specified.

Spacing
- Maximum 350 feet

Location
- On centerline of street (ZERO OFFSET, NO EXCEPTIONS)

Frame and Cover
- Neenah R-1733 with non vented lid, two pick holes and notch.
- Neenah R-1916-F with solid bolted cover (see standard specification) for manholes in flood plains.
- Rim to be set one eighth (1/8) to one quarter (1/4) inch below the pavement surface.

Adjusting Rings (Pre-cast reinforced concrete grade rings)
- Minimum 2”, Maximum 14” total height. Rim is to be set 1/8” to 1/4” low.

Drop Manholes

Type
- Outside drop ONLY (NO EXCEPTIONS) for drops 2 feet or greater.

Laterals

- Laterals must be shown on plans
- Label proposed size either by general note, or at each location on plan view.
- Tracer wire is required for laterals. This must be indicated on the plans.
- Indicate stationing, offset, slope, IE at the main and at ROW.

Size

- Four (4) inch diameter for single family residential
- Six (6) inch minimum diameter for multifamily and commercial dependent on plumbing code

Location

- ± one-half (½) of lot frontage (center of lot to avoid being located in future driveway)
- Connect to manhole where possible. When connecting to manhole, proper channelization of bench shall be provided per the standard specifications.
- Minimum of ten (10) feet from the closest edge of a catch basin.
- Separation from water lateral is per City and State Plumbing Codes.

Length

- Extended from the main to between zero (0) and two (2) feet past the right-of-way line

Marking

- Mark end of lateral with 4"x4" wood post, minimum four (4) feet exposed above ground and painted Sewer Utility green.

Tracer Wire

- Tracer wire is to be 10 gauge (or larger diameter) single-conductor wire, type UF.
- Tracer wire insulation shall be green for sewer laterals.
  See Standard Detail 461 for installation requirements.

WATER MAIN

Main

Material –Either of the following may be used under standard conditions. One or the other may be required to meet unusual conditions.

- D.I.W.M. – Class 52 cement lined.
- C-900 PVC

Depth

- Minimum six and one-half (6½) feet of cover for D.I.W.M.
- Minimum seven and one-half (7½) feet of cover for C-900 PVC
- Dimension depths at strategic locations, minimum or every 100 feet.

Location

- Ten (10') feet north or west of sanitary sewer main (centerline to centerline)
- Minimum separation from sanitary or storm sewers: Ten (10) feet. An eight (8) foot (statute) (centerline to centerline) separation may be allowed in limited locations on a case by case basis.

- Minimum vertical clearance between outside diameters:
  - Six (6) inches when the water main crosses above a sanitary or storm sewer
  - Eighteen (18) inches when the water main crosses below a sanitary or storm sewer
- Label horizontal distance from edge of curb flange to centerline of pipe, if less than five (5) feet. Minimum clearance shall be radius of pipe plus eighteen (18) inches.

Size

- Minimum eight (8) inch diameter, except six (6) inch may be permitted for cul-de-sacs less than two hundred (200) feet in length

Length

- Length of the water main shall be shown on the plan view as measured between tees, crosses, vertical breaks, and to the end of the line.

Pipe Polyethylene Wrap

- All D.I. water mains and fixtures shall have a polyethylene wrap covering, including but not limited to, valves, fittings, and hydrant riser. Double wrapping may be required at the time of review (usually in areas of high ground water or corrosive soils).

Dead Ends

- To be avoided, except in cul-de-sacs, or temporary end of street
- Standard hydrant required for flushing at dead ends, unless specifically waived by Water Utility

High Points

- High points are to be avoided where possible or located at a hydrant lead (to allow trapped air to be purged from the system).
- Air Release Valves may be allowed/required on a case by case basis if high points can not be avoided.
- Mid-block high points shall be adjusted to fall at a lot line so hydrants can be located at a lot line.

Utility Crossings

- When the water main or hydrant lead crosses over or under, within three (3) feet of the storm sewer, or catch basin lead, or sanitary sewer, the I.E. of both the water main and the sewer shall be indicated on the plan at the point of crossing. A minimum two (2) foot clearance is preferred. Insulation is required, and must be shown on the plans, at all locations where the clearance is less than two (2) feet. The Engineer shall attempt to modify the elevations of the conflicting utilities to provide the required clearance before proposing insulation.

Insulation

- See Utility Crossing above.
- Wherever the depth of the main is less than six and one half (6½) feet

Tracer Wire

- Tracer wire is to be 10 gauge (or larger diameter) single-conductor wire, type UF.
- Tracer wire insulation is to be blue for PVC main.

Laterals

Laterals must be shown on plans.

Material

- Copper (single family)
- Material will depend on size of lateral for all laterals greater than two (2) inches in diameter.

Location

- ± one-half (½) of lot frontage (center of lot frontage to avoid locating in future driveway)
- The minimum cover over the lateral is six and one half (6 ½) feet.
- The minimum vertical clearance between the outside diameters of the water lateral and any sewer line shall be twelve (12) inches when the water lateral crosses above the sewer and at least eighteen (18) inches when the water lateral crosses below the sewer.
- The minimum horizontal separation of water service laterals with respect to sanitary sewers shall be:
    1. Eight (8) feet if the water lateral is 2.5 inch diameter or larger.
    2. Eight (8) feet in the water and sewer laterals are not installed concurrently (during the same construction project).
    3. When the water and sewer laterals are installed concurrently and the water lateral is less than 2.5 inches in diameter, the minimum horizontal separation of the centerlines shall be thirty (30) inches. The horizontal separation may be less than thirty (inches) provided that the bottom of the water pipe is at least twelve (12) inches above the top of the sewer pipe.

- The minimum horizontal separation of water service laterals with respect to storm sewers shall be twelve (12) inches.

Size

- Minimum one and one-quarter (1 ¼) inch inside diameter for single family residential. Larger sizes may be required in low pressure areas.
- Commercial sizes based on amount of water supply needed
- Two family and multifamily sizes based on amount of water supply needed
- Label the proposed size either by general note, or at each location on plan view.

Length

- Extended from the main to shutoff location (this is to be from zero (0) feet to two (2) feet past the ROW line).

Marking

- Mark end of lateral with 4”x4” wood post, minimum four (4) feet exposed above ground and painted Water Utility blue.

Shutoff Location

- For copper laterals: at the right-of-way line with a tolerance from zero (0) to two (2) feet past the right-of-way line.
- All other lateral shut offs to be determined at time of review. The valves of larger laterals will likely need to be located near the main.

Non-conducting Laterals

- Tracer wire is required for non-conducting laterals.
- Tracer wire is to be 10 gauge (or larger diameter) single-conductor wire, type UF.
- Tracer wire insulation is to be blue for water laterals.
- See Standard Detail 462 for installation requirements.

Insulation

- Water laterals shall be insulated if less than six and one half (6½) feet of cover or if less than two (2) feet of clearance with storm or sanitary sewer.

Hydrants

Type

- Waterous Pacer WB-67, Mueller "Centurion", or Clow "Medallion" with bronze lower plate, all with auxiliary valves. Clow F-2500 hydrants are not allowed.
- Yellow color

Location

- At all intersections.
- Mid block hydrants shall be placed on extensions of lot lines.
- Minimum of five (5) feet from the closest edge of the catch basin at intersections.
- The center of the hydrant shall be four (4) feet from the back of curb.

Setting

- Bottom flange shall be one (1) to four (4) inches above finished ground elevation.
- Bury depth shall not exceed seven (7) feet. (Note 6 ½ feet of cover is required.)

Spacing

- Maximum five hundred (500) feet measured along the water main for single family and duplex residential zones and maximum three hundred (300) feet measured along the water main for commercial, industrial, and high density residential zones. Spacing shall include one (1) hydrant located at each street intersection.
- Locate one (1) hydrant at the end of the main in cul-de-sacs, and at the end of temporary terminations of mains.
- Additional private hydrants may be needed as a condition of site plan approvals for large parcels. Careful placement of hydrants on the street can help minimize the need for private hydrants. See Private Fire Hydrants below.

Private Fire Hydrants

1. Private hydrants may be required when the travel distance from a public hydrant to the furthest point of a building, on pavement, is more than 300 feet, or as required by Fire Department regulations (National Fire Protection Association code chapter 1141, National Water Works Association, and City Managers as referenced.) Any future building plans might also require additional private fire hydrants.
2. Private fire hydrants minimum water supply shall be no less than 1,250 gallons per minute, at no less than 20 psi residual water main pressure. Water mains supplying private fire hydrants must be a minimum of 6 inches in diameter as described by Natural Resources code 811.64 (2).
3. Private fire hydrants shall be placed 4.5 feet from the face of the curb (4 feet from the back of curb). All fire hydrants, public or private, shall be kept clear of

obstructions a minimum of 3.5 feet in all directions from the center tag nut of the fire hydrant.

4. If private fire hydrants are placed in islands, plantings shall be no taller than 8” high at maturity of the planting.

Note: There is a Fire Protection Service Demand Charge for private fire protection systems such as private hydrants or sprinkler systems. This fee will be charged quarterly and is based on the size of the connection. Contact the West Bend Water Utility at 262-335-5040 for the estimated charges.

Valves

Type

- Resilient wedge valve for sizes three (3) to twelve (12) inch, and Water Department approved butterfly valves for sizes over twelve (12) inches.

Spacing

- One (1) valve on the main adjacent to all hydrants
- At water main intersections: The number of valves shall be equal to the number of legs of water main less one.

Location

- The station of the on-main valve at each hydrant shall be ± five (5) feet from the hydrant station.
- Valves at the street intersections shall be positioned as close to the extension of the curb line as possible.

High Point Air Release

One (1) inch air release assembly, or a hydrant, shall be positioned at the high point(s) of the water main

Electrical Continuity

Throughout water main by use of copper straps or cables.

STORM SEWER

Main

Material

- Reinforced concrete pipe (R.C.P.) with rubber gasket joints

Class of Pipe

- Shall be shown on plans, and calculations shall be submitted with plan submission.

Size

- Minimum twelve (12) inch diameter. Sizing calculations must be submitted.

Slope

- Minimum one-half percent (0.50%)

Location

- Ten (10) feet south or east of the sanitary sewer main (centerline to centerline)
- Indicate distance from edge of curb flange to centerline of pipe, if less than five (5) feet. Minimum clearance shall be radius of pipe plus eighteen (18) inches
- The depth of the main, and the size of the pipe, will be reviewed to determine if additional clearance will be required.
- Minimum separation with water main is ten (10) feet. An eight (8) foot seperation (statutes) may be allowed in limited locations on a case by case basis.

Design

- Capacity shall be based on the ten (10) year storm events if runoff from larger storm events can be conveyed by gravity in the street to a logical discharge location. If low points are present or proposed in the street profile, then runoff from the one hundred (100) year event shall be carried by the storm sewer from the low point to the logical discharge location.

Utility crossing

- When the water main or hydrant lead crosses over or under the storm sewer, or catch basin lead, or sanitary sewer, the I.E. of both the water main and the sewer shall be indicated on the plan at the point of crossing.

Cover

- The minimum cover on the storm sewer pipe shall be three (3) feet.

Manholes

Type

- Pre-cast reinforced concrete

Size

- Four (4) foot diameter (standard) or larger diameter manholes will be required based on the size or quantity of pipes. The diameter of all manholes that are larger than four (4) feet shall be labeled on the plan.

Depth

- ± Five and one-half (5.5) feet measured from rim to invert of manhole (standard) and shall not be less than four (4) feet.
- If less than five (5) feet deep, a flat top manhole shall be specified and labeled.

Spacing

- Maximum three hundred-fifty (350) feet

Location

- Ten (10) feet south and east of sanitary sewer
- Ten (10) feet downstream of catch basins measured along the main centerline.

Frame and Cover

- Neenah R-1733 with vented lid with two (2) pick holes.
- Rim to be set one-eighth (1/8) inch to one-quarter (1/4) inch below the pavement surface.

Adjusting Rings (Pre-cast reinforced concrete grade rings)

- Minimum 2”, Maximum 14” total height. Rim is to be set 1/8” to 1/4” low.

Catch Basins/Inlets

Capacity

- Submit inlet capacity calculations for ten (10) and one-hundred (100) year storm events.

Types

- Pre-cast reinforced concrete

Depth

- Four (4) feet measured from the flow line of the grate to the I.E. of the outlet pipe. If larger than twelve (12) inch diameter pipe are required, the depth shall be adjusted accordingly to provide the minimum required three (3) feet of cover.

Sump

- Minimum twenty-four (24) inch sump measured from I.E. of the outlet pipe.

Spacing

- Maximum three hundred-fifty (350) feet measured from last upstream catch basin, or from high point.
- Ten (10) feet upstream of neighboring catch basin when dual catch basins are needed (inlet capacity analysis)

Location

- ± Ten (10) feet upstream of manhole (measured parallel to the main centerline) or ten (10) feet upstream of the adjacent catch basin (measured from center of structure to center of structure)
- On the extension of lot line, or centered on lot, to minimize conflict with future drive approach
- Upstream of cross walks at intersections
- At low point of vertical curve

Frame and Grate

- Neenah R-3067 with Type V vane grate, except at low points where the Type R (diagonal) grate shall be used. On major streets, Type L (heavy traffic) vane grates may be required.
- Indicate location of any Type R or Type L grates with a note that all other locations shall be Type V.

Adjusting Rings

- Minimum two (2) inch, Maximum six (6) inch.

Catch Basin Manholes

Use

- The use of catch basin manhole structures will be prohibited except in very limited locations and situations. Their use must be approved in advance by the City Engineer. The request to use catch basin manhole structures shall be made in writing and shall include an explanation as to why these structures are needed.

Capacity
- Submit inlet capacity calculations for 10 and 100 year storm events.

Type
- Conforming to the standard storm sewer manhole detail, except with flat top having a rectangular opening to accept the standard Neenah R-3067 frame.

Depth
- ± Five and one-half (5.5) feet measured from flow line of the grate to invert of manhole shall not be less than four (4) feet or enough to provide three (3) feet of cover.

Size
- Four (4) foot diameter (standard) or larger diameter manholes will be required based on the size or quantity of pipes. The diameter of all manholes that are larger than four (4) feet shall be labeled on the plan.

Frame and Grate
- Neenah R-3067 with Type V vane grate, except at low points where the Type R grate shall be used. On a major street, Type L (heavy traffic) vane grates may be required.
- Indicate location of any Type R or Type L grates with a note that all other locations shall be Type V.

Adjusting Rings
- Minimum two (2) inch, maximum six (6) inch.

Field Catch Basin

Capacity
- Submit inlet capacity calculations (10 and 100 year storm events)

Types
- Pre-cast reinforced concrete manhole (Type "A") is required for depths greater than 36 inches and for outlet pipes greater than 12 inches diameter. Type "A" is the preferred option.
- 24 inch RCP placed vertically (Type "B"). See the Standard Specifications for details.

Depth
- Four (4) feet measured from the flow line of the grate to the I.E. of the outlet pipe. If larger than twelve (12) inch diameter pipe are required, the depth shall be adjusted accordingly to provide the minimum required three (3) feet of cover.

Sump
- Minimum twenty four (24) inch sump measured from I.E. of the outlet pipe to the floor of catch basin

Location
- The center of the basin shall be a minimum of ten (10) feet from the house side of the sidewalk, and shall not be located on the lot corners. Ground slope from sidewalk to top of frame shall not exceed 4:1 and shall include a two (2) foot shelf behind the walk that does not exceed a slope of 2 %.

Grade
- The top of the frame is to be at or below the elevation of the house side of the sidewalk or the adjacent finished ground elevation.

Frame and Grate
- Neenah R-2561 Type A beehive (Detail 425)
- Neenah R-2563 Type B beehive (Detail 426)

Adjusting Rings
- Minimum two (2) inch, maximum six (6) inch for Type A catch basin.

Catch Basin Leads

Capacity
- Submit inlet capacity calculations (10 and 100 year storm events), which will dictate the required pipe capacities

Size
- Minimum twelve (12) inch diameter

Type of Material
- Reinforced Concrete Pipe

Slope
- Minimum of one percent (1%)

Interconnection of Catch Basins
- Maximum of two (2) catch basins to be interconnected unless specifically requested in writing with justification (capacity issues may be considered).

Cover
- The minimum cover on the storm sewer pipe shall be three (3) feet.

Trash Grates
- Trash grates shall be installed at all outfall locations of the storm sewer. Hinged grates are required for pipes 24 inch diameter or greater.

Sump Pump Line Connection
- Per the City of West Bend Municipal Code Section 18.08(11)(c) of the Subdivision Code, and Section 15.09 of the Plumbing Code, the Developer may be required to install a collection line parallel to the curb to conduct sump waters to the storm sewer and connect all sump drains to said collection pipe. A combination sump drain/underdrain may be required. This is typically required in areas of high ground water. See Standard Detail 452 for sump pump (drain) connection line and Standard Detail 453 for combination underdrain and sump pump (drain) connection line.

Size
- Adequate to handle the discharge

Material
- HDPE or PVC (HDPE is not permitted under pavement.)

Location
- Six (6) to twenty-one (21) inches behind BOC
- Laterals are to be located at the mid point of the lot

Slope
- Minimum one-half percent (0.50%)

Cleanouts
- Every 300 feet (minimum) and at the upstream end of pipe

Connection
- To a catch basin or other storm sewer structure. No direct connection to pipes.

Tracer Wire
- Tracer wire shall be 10 gauge (or larger diameter) single-conductor wire, type UF.
- Tracer wire insulation shall be brown for storm laterals.
- See Standard Detail 452 for installation requirements.

Installation
- Prior to curb construction.

STREET DESIGN

Maximum centerline grades:
- Arterial streets – maximum six percent (6%)
- Collector streets – maximum eight percent (8%)
- Minor streets, alleys and frontage streets – maximum ten percent (10%)

Minimum centerline grade
- One-half percent (0.50%)

Vertical and horizontal curves
- Shall be designed per AASHTO Standards
- Municipal Code (Chapter 18) requires that for streets with deflection angles of more than 10º, the centerline radius be a minimum of:
    - Arterial streets and highways – 500 feet
    - Collector streets – 300 feet
    - Minor streets – 100 feet
- A one hundred (100) foot minimum tangent section shall separate reverse and compound horizontal curves on arterial and collector streets as stated in the Municipal Code.
- A one hundred (100) foot minimum tangent section should separate reverse and compound horizontal curves on minor streets. If a 100 foot separation cannot be provided, then no tangent section should be provided (zero separation).

Minimum length of vertical curve.

- For vertical curves use the one to fifteen (1:15) ratio of algebraic difference as stated in the Municipal Code (Chapter 18).
- Provide the design speed used and the stopping sight distance determined.

Crown

- The top of the crown shall be at the centerline of the road.
- 2.5% cross slope (standard). Label all areas of non-standard crown.

Intersection design

- The centerline grade at the intersection of all streets shall not exceed ± two percent (2%) through the intersection and along the approaches for a minimum of fifty (50) feet.
- Intersection drainage shall be considered in designing intersection "Warping" to match streets.
- The crown and gutter line of the "through" street shall be maintained through the intersection.
- Spot elevations are required on plans to ensure proper drainage design.
- Location/station of transition from standard cross section shall be shown on plans.

Acceleration/deceleration Lanes

- Acceleration/deceleration lanes may be required in anticipation of traffic volumes and/or truck movements.
- Turn lanes may be required at intersections in anticipation of traffic volumes and/or truck movements.
- Use FDM SDD 9 A 1-12a type B intersection as a starting point for design.

CURB, GUTTER AND SIDEWALK

Curb and Gutter

- A separate plan sheet shall be developed for curb, gutter and sidewalk design. While the curb, gutter and sidewalk plan may incorporate paving and grading details, they shall not be a part of the utility plan sheets to ensure readability.
- No modification of the standard detail for curb, gutter or sidewalk will be considered for slip forming construction.
- The proposed profile shall be shown.
- The station and elevation of all horizontal and vertical break points shall be shown.
- Include the P.C. and P.T. of intersection radii and main line curves
- The station of proposed driveway cuts shall be shown, if known. It is preferred that driveway cuts be made at the time of building construction and not at the time of curb construction. If the driveway cuts are to be done with the building construction, the driveway cuts are not shown on the plans.
- The intrersection curb radii shall be labeled. The station and offset of the radius point shall be labeled.

- Standard radii for intersecting streets with the following right-of-way widths are as follows and are measured to the back of curb.

Street “A” R.O.W. (Feet)	Street “B” R.O.W. (Feet)	Pavement Width "A" * (Feet)	Radius (Feet)
66	66	36	15
80	66	36	15
80	66	40	25*
80	80	40	25*
100	ANY	46	35*
100	ANY	52	35*

** Larger pavement/R.O.W. controls radius (see note under curb ramp)*

Sidewalk

- Five (5) feet wide
- The house side of sidewalk shall be two (2) feet off the ROW (toward the street centerline).
- The elevation of the street side of the sidewalk shall be a minimum of one-third (1/3) inch per foot above top of curb (standard). Maximum height above the top of curb is to be determined at the time of review, if required. Show areas of non-standard sidewalk elevation on plans and label slope of terrace (typical maximum terrace slope is 10%)
- Minimum one (1) inch pitch across sidewalk toward street.
- Maximum two and one-half (2½) inches of pitch across the sidewalk. This shall only apply in transition areas to match curb ramp within ADA required slopes, and at existing driveways (allowed on reconstructions only).
- Indicate any sidewalk section with more that the one (1) inch standard pitch, by station of start and end of transition.
- When the walk is not at standard cross section location, the point at which it transitions from standard shall be labeled with station and elevation. Sidewalk elevations near intersections may need to be adjusted (raised or lowered) to meet the proposed grade of the curb and curb ramp.

Curb Ramp

- Show curb ramps and label the curb ramp type (see appendix). Type II is preferred.
- ‘T’ intersections will require ramps at both sides of the side street and both sides of the through street at one corner of the intersection (minimum). In other words, there is to be a handicap accessible pedestrian crossing on the side street at the corner and a through street handicap accessible crossing for one corner (minimum).
- The curb ramp shall be located a minimum of three (3) feet from any driveway and eighteen (18) inches from any pole, or other obstruction.
- A driveway will not be considered a substitute for a required curb ramp.
- Every consideration will be given to position the curb ramps for the benefit of the intended users. The location shall be determined based on the shortest and safest route across the traffic lanes.
- The maximum pitch on the curb ramp is twelve to one (12:1), or eight and one-third percent (8.3%). (As mandated by Federal Regulations)
- Where oversized curb radii are proposed, additional R.O.W. may be required to accommodate ramps.
- Detectable warning fields for curb ramps are required and their use may be listed as a note on the drawings. The detectable warning field shall conform to Standard Detail 534

and shall be installed as shown on Standard Details 531 and 532. The detectable warning field shall meet Federal requirements.

STORM WATER MANAGEMENT PLAN/PERMIT

In addition to the requirements listed under Storm Sewer (Inlet capacities, pipe sizing and manhole sizing), the following shall be included for Storm Water Management Plan/Permit:

- Show existing flood plain, flood fringe and wetlands boundaries on plan.
- Designate public or private ownership of SWM facilities. Public ownership is not typical and is subject to Common Council action.
- Easements for Maintenance
    1. A minimum twenty (20) foot vehicle access easement to the storm water management facility and on one side of the facility.
    2. A minimum ten (10) foot maintenance easement on remaining sides of facility.
    3. The maximum slope on vehicle access area of the easement shall be ten to one (10:1).
    4. Municipal easements shall be labeled as noted under the EASEMENTS section of this document.
- Provide one (1) foot of freeboard above the 100 year storm level of the retention or detention basins.
- Provide safety shelves on ponds with permanent pools over three (3) feet deep. The safety shelf shall be no steeper than 10:1. (Not required on dry ponds.)
- Side slopes of ponds to be no steeper than four to one (4:1) above the safety shelf and two to one (2:1) below the safety shelf.
- The outside slope of a berm around a pond (retention or detention) may be as steep as three to one (3:1), however, four to one (4:1) or flatter is preferred. (5:1 on publicly owned property)
- Show a detail of inlet and outlet structures.
- Supply design computations based on N.R.C.S. TR-55.
- Supply completed Storm Water Management Permit Application form with review fee.
- All plans must satisfy DNR water quality requirements contained in NR 151 and NR 216.

See the appendix for the checklist for compliance with Chapter 23 of the Municipal Code Storm Water Management Plan, for additional guidelines.

EASEMENTS (PLATS AND CSM'S)

PRIVATE EASEMENTS

Private easements will be required where any water other than street water, originating from one or multiple parcels, crosses or is collected in another parcel distinct from the parcel(s) where the water originated. These easements are usually for backyard or side yard swales.

Private easements shall be wide enough to contain the bottom of the swale or ditch and to accommodate the anticipated flow of water.

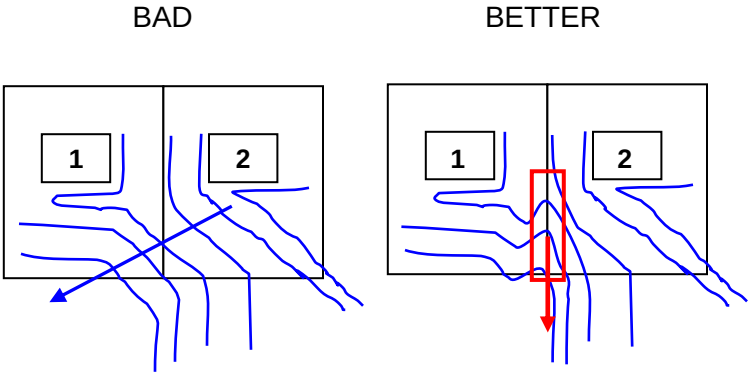
These private drainage easements should be subject to restrictive covenants as set forth by the Developer's Agreement.

Example:

"All private drainage easements shown on the Plat shall be preserved and maintained by the property owners in accordance with the approved Grading Plan and Storm Water Management Plan."

This provision does not necessarily require an easement if 2 (two) properties send their storm water to a minor swale running along their common boundary. Enforcement of the grading plan should ensure perpetuation of this type of swale.

In case of sheet flow from property-2 across property-1, asking for a different design to allow the property owner (1) to be able to use more of his/her land could solve the issue. In the "BETTER" example a swale should be created in the area indicated by the rectangle to redirect water.



Municipal Easement Locations

Easements containing municipal improvements should be configured keeping both the improvement and access to that improvement in mind (flat area, drivable area…). The cross slope on any easement shall be no greater than 10:1 in areas where vehicular access is proposed.

All easements for municipal improvements shall be granted to the City of West Bend. No easements which overlay a City easement shall be granted to other agencies, or utilities, without the consent of the City.

Municipal easements are required for the following situations:

- Anytime street water, carried in a public storm sewer crosses private property. (The easement ends at least 10 (ten) feet beyond the end of the pipe.)
- Where storm water from a large area or multiple lots is directed to rear and side yard swales, a field inlet should be considered to capture the storm water and direct it to the storm sewer system in the street rather than allowing the water to flow over the public sidewalks. A field inlet would be located at least 10 feet behind the sidewalk and surrounded by a 20 foot x 20 foot Municipal Easement.
- Anytime street water travels through private property in an open channel with the following purposes:
  - To reach public property
  - To reach a separate parcel where detention facility or natural detention area is located. (The parcel is not usually included in the easement.)
- Anytime the City Engineer believes the path of a channel carrying street water needs to be protected to ensure proper flow at all times
- Anytime the City is solely responsible for maintenance of a **regional** storm water detention/retention facility on private property (The City normally DOES NOT maintain

subdivision storm water detention/retention facilities). The easement shall encompass the pond/facility as well as access and a flat area around the pond to facilitate maintenance operations.

- Anytime access to a subdivision detention/retention facility is not available via an adjacent roadway, a separate Municipal access easement must be created to provide access to the facility.
- The reason for requiring Municipal access easements is to provide the City access to the privately owned and maintained facility to perform corrective maintenance in the event the owner failed to maintain the facility.

Easements rights and restrictions shall be listed in the Developer's Agreement as follow:
"All easements dedicated to the City or the public on the Plat or by this agreement grant the City the right to construct, install, maintain, inspect, repair and replace the designated improvements in, on, over or under such easements. Lots within the Plat shall not be used in a manner that interferes with the City's easement rights. The City's only obligation to restore the property after any use by the City of its easement shall be to grade the soil, replace topsoil and plant grass seed."

By Storm Water Management Ordinance (chapter 23 of City Code, § 23.08(3)), in the case where facilities are privately owned but the owner has failed to maintain the facility, the City can enter and fix the problem, after giving the owner 30 days written notice.
The developer's agreement typically allows the City to waive this waiting period in paragraph (I)(D)(5):
"Outlot _____ of the Plat and the storm water management facilities therein, shall be owned and maintained by the owners of the lots in the Plat. In the event that the owners of the lots in the Plat fail to maintain the Storm Water Management facilities in the Plat in accordance with standard engineering practices as determined by the City Engineer, ***The City may at any time, and without first obtaining permission*** *to enter onto Outlot _____, to inspect, repair, alter, maintain, replace or reconstruct the storm water management facilities in Outlot _____ and assess the costs thereof in accordance with Paragraph B of Section III of this Agreement."*

This provision is needed in case of an emergency.

Detention/Retention Facilities Ownership and Easement in Subdivisions

- Detention/Retention ponds should be located on a separate outlot. If a detention/retention facility is not located on a separate outlot, then Municipal or private easements, depending on who is responsible for the facility, should be configured as described above.
- All lots in the subdivision will need to own equal shares of the outlot containing the detention/retention facility to which their property drains.
- No public or private easement is typically required over the outlot because it is typically privately owned and maintained per the following language contained in the standard Developer's Agreement:

  (I)(D)(5) - *"Outlot _____ of the Plat and the storm water management facilities therein, shall be owned and maintained by the owners of the lots in the Plat. In the event that the owners of the lots in the Plat fail to maintain the Storm Water Management facilities in the Plat in*

accordance with standard engineering practices as determined by the City Engineer, ***The City may at any time, and without first obtaining permission*** *to enter onto Outlot _____, to inspect, repair, alter, maintain, replace or reconstruct the storm water management facilities in Outlot _____ and assess the costs thereof in accordance with Paragraph B of Section III of this Agreement."*

Easement Size

The minimum size of a Municipal utility easement (Sanitary Sewer, Water Main, Storm Water, Access) is:

- One (1) utility – 20 feet wide
- Two (2) utilities – 30 feet wide
- Three (3) utilities – 40 feet wide
- Field inlet – 20 feet by 20 feet
- Ditch – Top width of the ditch plus 10 feet (for access)

Wider easements may be required for larger or deeper than normal improvements, where buildings may limit accessibility or as determined appropriate by the City Engineer.

Easements Plan Labels

Easements to the City

WATER:	Municipal Water Main Easement
SANITARY:	Municipal Sanitary Sewer Easement
ACCESS:	Municipal Access Easement
STORM WATER:	Municipal Storm Water Easement

Private easements

WATER:	Private Water Main Easement
SANITARY:	Private Sanitary Sewer Easement
ACCESS:	Private Access Easement
STORM WATER:	Private Drainage Easement

Public Easements

UTILITIES:	Utility Easement (Telephone, Electricity, Gas, Cable, etc…).

CONSTRUCTION PLAN CONTENTS (UTILITIES)

COVER SHEET

- Location sketch relative to city map (minimum 1" = 1,000' Scale)
- Show the relative location of the project within the city, or show a minimum of two (2) existing adjacent streets and their location relative to the project.
- Name of development
- Name, address and telephone number of the Developer
- Name, address and telephone number of the Developer's Engineer
- Types of utilities, or other improvements
- Sheet index
- NGVD 1929 benchmarks used for the development with a description of the benchmarks and their location.

UTILITY SYSTEM PLAN SHEET

- Scale 1" = 100' minimum
- An overall plan view of the development and proposed placement of utilities, including pipes, manholes, valves, hydrants, catch basins, SWM facilities, etc.
- Flow arrows on sanitary and storm sewers.
- Identify the size, type (sanitary, storm, water, etc.), and length along utility line
- Proposed centerline and centerline stationing

PLAN VIEW

- Scale 1" = 40' minimum
- Design and revision dates
- Proposed design
- Proposed utilities
    1. Dash, shadow, or otherwise show the other existing or proposed utilities to indicate possible conflict locations
- Centerline horizontal curve data
- Other features
    1. Proposed centerline
    2. Centerline stationing – with tic marks at all P.H.C. and P.H.T.
    3. Proposed curb line
    4. Proposed R.O.W. Line
    5. Proposed lot lines
    6. Proposed lot frontage dimensions
    7. Proposed lot and block numbers
    8. R.O.W. , pavement width and all other dimensions generally shown on cross-section drawings
    9. Existing and proposed easements – with labels or symbols which clearly distinguish public versus private easements.
    10. Show any Benchmarks in their proper location with elevation and description.
- Datum Basis
    1. Vertical Control shall be based on NGVD 1929 datum benchmarks
- Potential conflicts with existing and proposed facilities
  Show the location of the conflict (Label the area of conflict.)

- Manholes
    1. MH number, I.D., or stationing
    2. MH offset from the centerline (Indicate left or right of centerline as well as distance.)

If not given on the profile, also show the following:

    3. Rim elevation
    4. I.E. and direction (N, E, S, W,…) of all pipes in MH
    5. Depth of manhole from top of frame to discharge I.E.
    6. MH label to be tied to MH with arrow if not immediately adjacent to structure location
    7. Give type of MH if not standard (i.e. flat top or CB/MH)
    8. Diameter of manhole if not standard 48 inch inside diameter.
- Pipes
    1. Utility Type (sanitary, storm, or water)
    2. Material Type (P.V.C., R.C.P., etc.) and class.
    3. Size
    4. Length (measured from center of structure to center of structure)
    5. Distance from edge of curb flange to centerline of pipe, if less than five (5) feet
        - ✓ *Note:* **Minimum distance from edge of curb flange to centerline of pipe** allowed is **diameter** of pipe **plus 18 inches** for water and storm mains and **diameter** of pipe **plus 30 inches** for sanitary sewer mains. Actual required distance will be greater if finish road surface elevation is more than 5' higher than I.E.
    6. Pipe slopes (Pipe length is measured from center of manhole to center of manhole. The slope is the difference in invert elevation divided by pipe length.)
- Laterals
    1. Station (Middle of lot frontage)
    2. Type and Size
        - ✓ *Note:* A general note on type and size of all proposed sewer and water laterals on the project, with exceptions noted at specific locations on plans, is acceptable.
- Hydrant
    1. Station and offset
    2. Bottom flange elevation (to be between 1" to 4" above proposed finished ground elevation immediately adjacent to the hydrant)
    3. Bury depth (Minimum 6 feet, anything over 7 feet is subject to City approval. The intent is that there be the required cover and that the valve can be operated with a standard key.)
- Water Valves
    1. Size
    2. Type – (Butterfly or Resilient Wedge)
- Water Fittings
    1. Size
    2. Type – (Cross, Tee, Reducer, etc.)
- Catch Basins
    1. CB number and stationing (CB number should correspond to the MH number plus a letter. For example the catch basins associated with MH 8 would be CB 8A, CB 8B, etc.
    2. CB offset (Offsets are measured to the center of the structure at the back of curb.)
    3. Type of grate 'V', 'R' or 'L' grate

If not given in profile view, show the following:

1. Top of curb
2. Grate elevation at curb flow line
3. I.E. of all pipes in CB
4. Depth of sump measured from lowest I.E.
5. Elevation of bottom of the sump
6. Depth of the structure (Rim/grate elevation to sump elevation)

- Inlets
  1. Catch basins are preferred. Where effectiveness of sump is questionable (ie. 3 or more catch basins in series), inlets shall be used.
- Catch Basin/Inlet Leads
  1. Size, Type and Class of Pipe
  2. Can use general note – All leads 12" R.C.P. Class IV unless noted otherwise, if applicable.
  3. Length of lead (Measured from the center of the CB or inlet to the center of the downstream structure.)
  4. Slope of lead (The slope is the difference in invert elevation divided by the pipe length.)

PROFILE VIEW

- Centerline Profile (Proposed and Existing)
- Vertical Curves and Curve Data
- Profile Grid Stationing and Elevations
- Pipe Profile
- Proposed Design
- Proposed utilities
  1. Dash, shadow, or otherwise show the other existing and proposed utilities to indicate possible conflict locations
- Utility Type
- Size
- Type of material
- Length
- Slope of utility mains including water main
- Water main
  1. Horizontal and Vertical break point station, offset and elevation
  2. Valve stationing, offset and elevation
  3. Fitting stationing, offset and elevation
  4. Hydrant lead and lateral stationing and elevation (at the main)
- Manholes
  1. MH number or I.D.
  2. MH stationing
  3. MH offset from the centerline (Indicate left or right of centerline as well as distance.)
  4. Rim elevation
  5. I.E. and direction (N, E, S, W,…) of all pipes in MH
  6. Depth of manhole from top of frame to discharge I.E.
  7. MH label to be tied to MH with arrow if not immediately adjacent to structure locations
  8. Give type of MH if not standard (i.e. flat top or CB/MH)
  9. Diameter of manhole if not standard 48 inch inside diameter.

- Crossings and Conflicts
    1. Station
    2. Utility type
    3. Elevation at closest point to conflict (top of pipe, etc.)
    4. Clearance

DETAIL SHEET

Show details of non-standard improvements

Details such as SWM outlet structures shall include specifics on design including:

- Drawing of improvement
- Dimensions
- Materials
- Method of access to structures or other improvements for maintenance

DO NOT include details from the City Standard Specifications or the Engineers Standard Details for standard improvements such as manholes, catch basins, hydrants, etc…Instead, REFER the Contractor to the City Standard Specifications for these standard details.

CONSTRUCTION PLAN CONTENTS (NON UTILITY)

PLAN VIEW

General

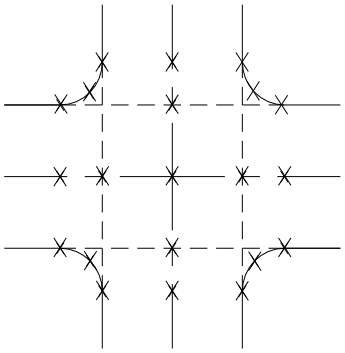
- Scale 1" = 40' minimum
- Design and revision dates
- Proposed design
- Centerline horizontal curve data

Other features

- Centerline
- Centerline stationing – with tic marks at P.H.C., P.H.T., and each station
- Curb line
- Length of curb
- Curve Data
- Right-of-Way line
- Lot lines
- Lot frontage
- Lot and block numbers
- Dimensions and widths of features
- Existing and proposed easements – Indicate municipal, private, or public utility (gas, electric, telephone, cable, …)
- All proposed manholes, catch basins, inlets, hydrants and valves
- Show any benchmarks in their proper location with description and elevation.

Street Grading and Paving

- Plan and profile
- Scale 1” = 40’ minimum
- Street alignment (Horizontal and Vertical)
- Right-of-way dimension
- Pavement width
- Curb radii at intersections (back of curb)
- Lot lines
- Lot and block numbers
- Proposed drainage ways
- Existing and proposed SWM facilities
- Horizontal and vertical curve data
- Stationing
- Proposed utilities (plan view and profile view)
- Centerline and back of curb elevations every 50 feet in tangent sections and every 25 feet in horizontal and vertical curves plus PVT, PVC and high and low points of vertical curves.
- Intersection spot elevations (see sketch below)



Sidewalks

- Spot elevations
  1. Back of sidewalk at street intersection
  2. Street side of sidewalk at street intersection
  3. Gutter elevation at center of curb ramp
  4. Sidewalk elevation at gutter along centerline of curb ramp
- Station and elevation of the start and end of transition from standard location and elevation of sidewalk to end of transition

Curve design speed (horizontal and vertical)

- The curve design shall be based on AASHTO standards for design speed
- See section 18.07 of the Subdivision Code for minimum standard for horizontal curves.
- Indicate the design speed used.
- Indicate the stopping sight distance on crest vertical curves

Cross sections

(If streets will NOT be rough graded prior to utility construction, cross sections will be required)

- Scale (Horizontal and Vertical)
- Stationing
- Grid lines labeled with elevations
- C/L and left and right offset labels of grid lines
- Existing ground surface
- Proposed finished grade surface
- Proposed subgrade surface

Grading Plan

(Will not be considered acceptable for grading of street right-of-way, but may be submitted for background information. Review and approval by the Plan Commission is required. Submit separately to the Department of Community Development, for Plan Commission action. See Section 17.39 of the Municipal Code.) The following is a partial list of items of interest to the Engineering Department:

- Scale 1" = 50' minimum
- Street alignments
- Right-of-way dimension
- Pavement width and all appropriate dimensions
- Curb radii, dimension for intersection (back of curb)
- Lot lines
- Lot and block numbers
- Existing and proposed contours, maximum interval for contour lines is two (2) feet
- Drainage ways
- Easements
- SWM facilities
- Erosion control facilities
- Boundaries of existing soil types from NRCS maps/data.
- Existing and Proposed Utilities

Curb and Gutter and Sidewalk

- Profile
- Station and elevation of all horizontal and vertical break points – including P.C. and P.T. of main curves and intersection radii and end of project
- Station of proposed driveway cuts – if known at the time of plan preparation. It is recommended that, for single family homes, driveway cuts be made at the time of home construction rather than at curb installation.
- Flow arrows for gutter flow around the intersection curb radii
- Elevation at intersection, of the house side and the street side of intersecting sidewalks
- Elevation at center of curb ramp in gutter (provide sufficient elevations to verify ramp slope)
- Elevation on top of curb at midpoint of curb radius, if not the location of the curb ramp.
- Specify which type of curb ramp is to be constructed. Type II curb ramps are preferred.
- Profile of house side of sidewalk and of top of curb from curb ramps to match point (of standard cross section) on profile
- Curb radius dimension to back of curb and station and offset of radius center point
- Slope of terrace (if non-standard)

Cul-de-Sac

- Center elevation of cul-de-sac shall be shown in plan view.
- The top of curb elevation shall be shown on the plan view of the curb plans at twenty-five (25) foot intervals of arc, at horizontal break points, the point at which the opposite curbs meet on the end of the cul-de-sac, and at the high or low point, in the cul-de-sac. The station of each elevation, or the arc distance between the points for which elevations are given, shall be noted.
- Curb radius dimension to back of curb, and station and offset of radius center point
- Station and elevation of P.C. and P.T. of curb radii
- A minimum five (5) foot radius is desired at the right-of-way at the intersection of the radius of the bulb of the cul-de-sac and the straight section of the road.
- Minimum curb slope is to be 0.5%. Minimum cross slope of the road, measured center line to curb flange is to be 1.0%. 2.5% is the preferred slope.

PROFILE VIEW

General

- Existing ground surface profile
- Centerline profile(Proposed)
    1. Station and elevation of P.V.C., P.V.I., and P.V.T.
    2. Station and elevation of high and low point
    3. Vertical curves and curve data
    4. Design speed
    5. Stopping site distance on crest vertical curves
- Profile grid stationing and elevations
- Station and elevation of all horizontal and vertical break points, including P.C. and P.T. of intersection radii and the end of the project
- House side of sidewalk profile
- Station and elevation of centerline on centerline

CROSS SECTIONS (waived for pre-grading project)

- Scale
    1. Horizontal 1” = 5’
    2. Vertical 1” = 2’, or same proportions (e.g. 10:4, etc.)
- Interval – Maximum fifty (50) foot intervals

Erosion Control for Project

An erosion control plan shall be developed for the project. It shall be reviewed and approved by the Department of Community Development (DCD) prior to the start of construction. It shall include the location of silt fences, straw bales, sediment ponds and or traps, tracking pads and other requirements needed to comply with the City’s erosion control ordinance. Designs shall comply with Wisconsin DNR Technical Standards, City storm water regulations, and all other DNR regulations (Chapter 30, NR 151, NR216, NOI). It should also show proposed location and type of devices that will be used to minimize access points to the site and indicate that the area is a construction zone. When dewatering is required by the project, the dewatering pumps shall only discharge in accordance with DNR Technical Standards. See the DCD website for further information. Contact the DCD for further information or log on to the City’s web site at www.ci.west-bend.wi.us to obtain additional information.

PRECONSTRUCTION MEETING

A preconstruction meeting shall be held after all required approvals are obtained but prior to the start of construction of each type of work on the project. Attendees should include the Developer's Engineer and Surveyor, the Contractor(s), the Developer, and the City's Engineer and inspector. In addition, depending on the type of work to be done by the Contractor, representatives of the Department of Community Development; Water Utility; Sewer Utility; Public Works; and Parks, Recreation and Forestry; as well as private utilities, may be invited to attend the preconstruction meeting.

If scheduling of various type of construction allows, more than one contractor may be invited to the preconstruction meeting and thus avoid the need for additional preconstruction meetings for subsequent types of construction.

The preconstruction meeting should be held two (2) to four (4) weeks prior to the planned date of the start of construction.

Recorded minutes of the preconstruction meeting will be used as a reference throughout the project's construction period. The Developer, or his agent, shall contact the City Engineer at least one (1) week prior to the desired meeting date. The City Engineer will contact other affected City departments, agencies and public utilities. The Developer shall contact his Engineer, Surveyor, Contractor and any subcontractors to advise them of the time and location of the meeting.

A copy of a standard preconstruction meeting agenda is available from the Engineering Department. This agenda is useful in preparing for the meeting.

MATERIAL CERTIFICATIONS

Prior to the start of construction, the Developer or his contractor shall supply statements certifying that the materials to be used comply with appropriate specifications. Some items for which certifications are required include pipes, manholes and manhole steps, inlets/catch basins, valves and hydrants. A certification shall be provided for each lot of materials used on the project. If the required certifications are not provided, work may be halted or improvements may not be accepted.

The certification shall include the following:

- Name, address, and phone number of the manufacturer
- Plant name or number is applicable
- Name, address and phone number of the supplier, if not the manufacturer
- Date of certification
- Type, size and class of item being certified
- Specification for which certification is being provided
- Name, title and signature of person authorized to certify
- Lot number of material certified, including manufacturer's name, lot number, production code number(s), and production date
- Name of project for which the material is being supplied.

SOILS INVESTIGATION REPORT

The Department of Community Development may require a Soils Investigation/Mitigation Report for the proposed development based on criteria in the City's subdivision code. If a soils report is required for building areas then it shall also include the roadway and pavement section investigation. Regardless of whether the Department of Community Development requires a report for building sites, the City Engineer may require a report for the roadway sections.

If a report is required, it shall be prepared and submitted to the City prior to review of the preliminary plat, or the plans for street improvements, whichever comes first.

The report regarding the roadway section shall include;

- Soil borings at locations agreed to by the City Engineer prior to the work.
- Soils log sheets
- Water table elevation determination
- Soils classification and boundaries (from soils maps)
- Proctor test results (standard proctor)
- Acidity test
- Conclusions
- Recommendations for the following:
  1. sub-grade
  2. pavement design
  3. backfill
  4. underdrains
  5. drainable base
  6. protection of utility pipes due to acidity

SOILS PROCTOR

Prior to the start of construction, the Developer shall provide proctor test data (based on Standard Proctor) for all trench and fill materials proposed for use on public improvements. This data shall include a plan showing the locations from which test samples were taken. The City Engineer shall be notified prior to the taking of the test samples so (s)he can witness the sampling and become familiar with the types of soils tested.

The number of test samples required for the development shall be based on a review of the soil maps for the development and other available information. Generally a minimum of two (2) samples from each soil type shall be tested. These shall be obtained in accordance with standard testing procedures. One sample shall be taken from the area within +/- 500 feet of public street centerline.

If other soil types are encountered during construction, additional proctor test data may be required. Since this may delay the acceptance of improvements, it is important that the Developer and his Engineer provide adequate data to allow for proper compaction testing.

SOIL COMPACTION CERTIFICATION

A soil compaction certification is required for all lots that are to be filled over two (2) feet. The soils engineer shall be on site inspecting operations and performing density testing on each lift placed on each lot that is to be filled over 2 feet. The soil compaction report shall be submitted to the City Engineer for approval. An as-built grading plan must accompany the submission. The soils report must be signed and sealed by a professional engineer licensed by the State of Wisconsin.

ASPHALTIC CONCRETE TESTING

Before paving begins, the Developer or his Contractor shall submit a mix design for each type of asphalt to be used on public streets within the development.

Samples shall be taken, by the Developer or his Contractor, of the asphaltic concrete materials being used on the project. These samples will be sent to a testing lab by the City. The cost of the testing will be billed to the Developer.

Tests will include asphalt content, aggregate gradation, and crushed count. One test will be performed for each type of asphaltic concrete mixture placed per paving day. Additional testing will be done at the discretion of the City Engineer in accordance with the City Standard Specifications.

CONCRETE TESTING

The City will perform all tests except the concrete cylinder compression test which will be done by an independent testing lab. The cost of the compression tests shall be borne by the Developer. Test results shall be sent directly to the City Engineer, by the testing facility.

VIDEOTAPING OF UTILITIES

The Developer shall videotape the sanitary sewer and storm sewer prior to acceptance by the City and provide the City with a report on the condition of the sewers. Specifications for this procedure are found in the City of West Bend Standard Specification for Public Works Construction **–** Section 440. The Specifications may be viewed on the Engineering page of the City website.

OTHER TESTING

Other on site testing shall be performed by the City and the Contractor and shall be included in the cost of inspection by the City or in the cost of construction by the Contractor.

PROJECT SURVEY CONTROL

Prior to the start of construction, the Developer shall have his Surveyor provide horizontal and vertical control points throughout the project area. This shall include the following:

Benchmarks

- Adequate vertical control points shall be provided to allow the City Engineer to check the work as required. A minimum of two (2) benchmarks shall be located within the development.
- Benchmarks shall be based on NGVD 1929 vertical control datum and tied to the City of West Bend Benchmark system. Existing benchmarks can be obtained from the City Engineer. The Bench Mark Database is available through the City's website at the Engineering page.
- The Developer's Surveyor shall run a closed bench circuit, from a City benchmark to the development and back, prior to the start of the work.

Horizontal Control Points

- Adequate horizontal control points shall be provided to allow the City Engineer to check the work as required.
- All horizontal break points, points of curvature on street right of way, and all block corners shall be temporarily established prior to the start of the work. These points shall be marked by the use of wood or metal stakes and lath to allow the City Engineer to easily identify them.
- Offset stakes will not be acceptable as the only means of checking the horizontal placement of the work.

Grade Stakes

Grade stakes shall be provided for the Contractor at least one day in advance of his work. Stakes shall be marked with station, offset, and cut/fill values, as well as a description for any control point stakes (i.e.: radius, P.C./P.T. of curb).

Cut Sheets
Copies of the cut sheets shall be given to the City Engineer at least one day prior to the Contractor beginning work in the areas staked. Information contained on the cut sheet shall include station, offset, proposed elevation, stake elevation, cut/fill values, as well as a description for any control point stakes (i.e.: radius, P.C./P.T. of curb).

SPECIAL PROVISIONS

All work shall conform to the City of West Bend Standard Specifications for Public Works Construction, latest edition. Additionally, the Developer's Engineer shall notify the City Engineer in writing of any special provisions for the work. Said special provisions shall be reviewed, and approved, by the City Engineer prior to the Contractor commencing work on the project.

PERMITS

The Developer, or his representative, shall be responsible for all permits required by the City, or by other agencies. The Developer, or his representative, shall also comply with all conditions imposed by the permitting agencies. Copies of all permits shall be submitted to the City Engineer prior to the start of any permitted work (Chapter 30, NR216 NOI, Army Corps, etc.).

When a Wisconsin D.O.T. permit is required for the project, the Developer's Engineer shall submit four (4) original copies of the completed permit application to the City Engineer, along with five (5) sets of plans showing the work requiring the permit. The Wisconsin D.O.T. will only issue the permit to the City, and therefore, the City must submit the application on behalf of the Developer and will do so only after review and approval of the plans. The Developer shall comply with all conditions imposed by WisDOT.

DNR SEWER AND WATER PERMIT

Work on the project shall not commence until a stamped set of DNR approved plans is received by the City Engineer. The DNR has revised their policy and do not return stamped plans for municipalities unless requested to do so at time of submission. Therefore, the Developer's Engineer must note this requirement at the time of submitting the plans to the DNR for approval.

GUARANTEE OF IMPROVEMENTS

The Developer shall guarantee all improvements for a period of one (1) year from the date of the City's acceptance. Acceptance shall be by the Board of Public Works and Common Council, based on a recommendation of the City Engineer.

STREET NAME SIGNS

The Developer shall send a copy of the final plat to the Director of the Department of Public Works. The Public Works Department will install the appropriate signs after the final grade of topsoil is in place. The City will invoice labor and equipment charges to the Developer.

TRAFFIC CONTROL

The Developer shall provide and maintain construction warning signs until final acceptance of all improvements by the City. This shall include, but not be limited to, the placement of Type III barricades at all approved access points to the project, as well as, Construction Ahead signs in advance of all access points. All access points to the project shall be approved as a part of the project review process.

The Developer shall provide and maintain Dead-End signs for new dead end streets and cul-de-sacs and end of the road markers for new dead end streets. Permanent end of the road markers are required for all new dead end streets including temporary dead end streets at the end of a subdivision phase. The permanent dead end markers will be subject to acceptance and guarantee rules as part of the acceptance of street signs.

All traffic control devices shall conform to the Manual of Uniform Traffic Control Devices (MUTCD), latest edition and the City's Standard Specifications.

Fire Apparatus Access

Fire apparatus access shall meet the minimum requirements of the Wisconsin Administrative Code, chapter Comm. 62.0500.

Questions to these requirements can be directed to the Fire Prevention Bureau @ (262) 335-5055

AS-BUILT PLANS

Submittal for review

As-built documents shall be Developed and submitted to the City Engineer for review, for all construction on the project.

The as-built documents submitted for review shall include:

- Two (2) copies (regular paper) of the as-built plans. The as-built data shall be placed on the approved project plans with the approved information crossed out but still readable.
- One (1) copy each of the Utility Inventory Sheets and Study Data Sheets. See appendix for copies.

The as-built documents shall include a complete set of plans and show constructed lengths, depths, invert elevations, slopes, lateral elevations at the ROW line, changes in units, location, stations, materials, sizes, other changes to the design plans, including original preconstruction bench marks and bench marks set on all hydrants within the development and any other miscellaneous changes.

As-built plans for the following shall be included:

- Sanitary sewer mains and laterals
- Water mains and laterals
- Storm sewer mains and laterals, and storm water management facilities (Including sump lines and underdrains.)

Sanitary sewer, water, and storm sewer as-built plans and data shall be approved by the City Engineer before the Engineering Department will schedule acceptance of the corresponding underground utilities by the Board of Public Works and the Common Council.

Final as-built plans

Once the as-built documents are deemed acceptable by the City, the Developer shall submit the final as-built plans. The as-built plans shall be inked, or photographically reproduced, on four (4) mil film (MYLAR). Separate as-built plans are required for each phase.

In addition, the Developer shall provide the City with CAD files of the as-built plans. Those files shall include all as-built improvements shown on the paper copy of the as-built plans, and at least one section corner and other information needed to insert the files into the City's GIS database. Details of file format, method of transmission and information needed, will be worked out between the Developer and the City Surveyor.

ACCEPTANCE OF IMPROVEMENTS

The acceptance of improvements will not occur until the Developer, or his representative, submits a request for approval in writing. Said request shall indicate the type of improvements for which acceptance is requested and the limits of those improvements.

The Developer should consult his developers Agreement with the City in planning for acceptance. Typically building permits will not be issued until the sanitary sewer, water main, and storm sewer have been accepted by Council Resolution and, at minimum, the gravel base is installed and temporary street name signs are installed. Similarly, occupancy permits will typically not be issued until all improvements except the top lift of asphalt have been accepted by Council Resolution.

Acceptance of improvements will generally be limited to two (2) requests per year for each development. This limit is imposed to reduce the paperwork and time required to process the review and to recommend acceptance by the Board of Public Works and Common Council.

Improvements will not be scheduled for acceptance on the Board of Public Work nor on the Common Council agendas until the as-built plans are approved.

Prior to acceptance of improvements, the following items shall be completed by the Developer and accepted by the City Engineer, in addition to the other requirements of the Developer's Agreement. This process shall be completed for each acceptance as needed, regardless of whether the acceptances are for a phase of the project for partial acceptance, or the acceptance is final.

- As-built plans conforming to the requirements previously noted in this document.
- As-built manhole and catch basin forms for the compiling of specific asbuilt data on manholes and catch basins, along with a copy of all benchmarks used to compile the data shall be given to the City Engineer. This data is required in addition to the data shown on the as-built plan noted above.
- Utility and street inventory forms shall also be completed and submitted prior to acceptance of improvements.
- Video taping of storm and sanitary sewer shall be completed and the report received and accepted by the City Engineer.
- Verification from the other affected City Departments that the improvements meet the requirements of their department and that they have no objections to the acceptance of maintenance. This will be obtained by the City Engineer upon written request for acceptance being obtained from the Developer.
- A walk through inspection meeting (on-site) has been completed by the City Engineer and the Developer.
- All "Punch List" items have been repaired. The "Punch List" is developed by City Engineering staff from notes taken during the Walk Through inspection meeting, and deficiencies/problems noted by other City Departments.
- Verification from the City Finance Administrator that all inspection (and other) invoices associated with the development have been paid in full. This will be verified by the City Engineer upon written request for final acceptance being obtained from the Developer.