CITY OF MEQUON

STANDARD SPECIFICATIONS for LAND DEVELOPMENT

EleventhTenth Edition
October July 20185

City of Mequon

ENGINEERING

11333 N. CEDARBURG ROAD MEQUON, WI 53092-1930 (262) 236-2934

TABLE OF CONTENTS

SECTION ..... PAGE

CHAPTER 1 2

SURVEYING 2
1.0 GENERAL 2
1.1 HORIZONTAL AND VERTICAL CONTROL 2
1.2 CONSTRUCTION STAKING 3
1.3 MONUMENTS 4

CHAPTER 2 5

CONSTRUCTION PLAN REQUIREMENTS 5
2.0 GENERAL 5
2.1 PLAN FORMAT 5
2.2 SUBMITTAL REQUIREMENTS 6
2.3 PUBLIC AND PRIVATE SANITARY SEWER PLANS 7
2.4 WATERMAIN PLANS 8
2.5 STORM SEWER PLANS 9
2.6 ROADWAY PLANS 10
2.7 GRADING AND DRAINAGE PLANS 12
2.8 EROSION CONTROL PLAN 13
2.9 STORMWATER MANAGEMENT PLAN 14
2.10 SIGNAGE AND PAVEMENT MARKING PLAN 15
2.11 LANDSCAPE PLAN 15
2.12 STREET TREE PLAN 15
2.13 PRELIMINARY PLAT 15
2.14 FINAL PLAT 15

CHAPTER 3 17

ROADWAYS 17
3.0 GENERAL 17
3.1 DESIGN 17
3.2 ROAD GEOMETRY 17
3.3 SUBGRADE 19
3.4 BASE COURSE 20
3.5 HOT MIX ASPHALT (HMA) PAVEMENT 22
3.6 LATE SEASON HMA PAVING CRITERIA 24
3.7 ROADWAY DRAINAGE SYSTEM 25
3.8 CONCRETE CURB AND GUTTER 25
3.9 CONCRETE SIDEWALK 26
3.10 HMA PAVEMENT BIKE & PEDESTRIAN PATH 26
3.11 PAVEMENT REPAIR 27
3.12 SIGNAGE AND PAVEMENT MARKING 29

CHAPTER 4 31

SANITARY SEWER 31
4.0 GENERAL 31
4.1 MATERIALS 32

4.2 MANHOLES 32
4.3 MAINLINE 33
4.4 LATERALS 34
4.5 LATERAL ABANDONMENT 35
4.6 TESTING 36

CHAPTER 5 37

WATER DISTRIBUTION SYSTEM 37
5.0 GENERAL 37
5.1 PIPE MATERIALS 37
5.2 TRACER WIRE 38
5.3 BEDDING, COVER, & BACKFILL 38
5.4 WATERMAIN TRENCH 39
5.5 DEWATERING 39
5.6 DUCTILE IRON WATERMAIN FITTINGS 40
5.7 HDPE WATERMAIN FITTINGS 40
5.8 WATERMAIN FITTING INSTALLATION 40
5.9 THRUST RESTRAINTS 41
5.10 TAPPING SLEEVE 41
5.11 WATERMAIN VALVES 41
5.12 FIRE HYDRANTS 43
5.13 WATER SERVICE LATERAL 44
5.14 CASING PIPE 50
5.15 INSULATION 50
5.16 PIPE INSTALLATION 51
5.17 METER STANDARDS 52
5.18 INTERNAL PRIVATE FIRE PROTECTION 53
5.19 EXTERNAL PRIVATE FIRE PROTECTION 53
5.20 FIRE CISTERNS 54
5.21 TESTING & DISINFECTION 55

CHAPTER 6 57

GRADING AND DRAINAGE 57
6.0 SUBDIVISION GRADING 57
6.1 EROSION CONTROL 57
6.2 DITCH GRADING 57
6.3 PUBLIC AND PRIVATE STORM SEWER 58
6.4 SUMP PUMP DRAINS 59
6.5 ON SITE STORM WATER DETENTION 59

CHAPTER 7 62

FILLING, EXCAVATING, AND BERMS 62
7.0 GENERAL 62
7.1 LAND DISTURBING ACTIVITIES 62
7.2 BERMS 63
7.3 RECREATIONAL AND AESTHETIC PONDS 64
7.4 RETAINING WALLS 65

CHAPTER 8 66

RECORD DRAWINGS 66
8.0 GENERAL 66
8.1 SANITARY SEWER RECORD DRAWINGS 66
8.2 WATER DISTRIBUTION SYSTEM RECORD DRAWINGS 67
8.3 STORM SEWER RECORD DRAWINGS 68
8.4 GRADING AND DRAINAGE RECORD DRAWINGS 68

APPENDIX A **1**
Detail Drawings 66
Figure 1-Typical Residential Street Cross-Sections 67
Figure 2-Residential Street Cross-Sections (Conservation Subdivisions) 68
Figure 3-Typical Residential Street Cul-de-sacs 69
Figure 4-Entrance Island 70
Figure 5-Acceleration /Deceleration Lanes & Intersection Bypass Lane 71
Figure 6-Concrete Curb and Gutter 72
Figure 7-Curb Inlets 73
Figure 8-Temporary Asphalt curb wedging 74
Figure 9-Sump Collector Clean Out 1
Figure 10-Sump Line 76
Figure 11-Fire Cistern Detail 77
Figure 12-Bike Path 78
Figure 13-Concrete Invert 79
Figure 14-Riprap Flume 80
Figure 15-Sediment Basin with Standpipe (5 Acres or more) 81
Figure 16-Sediment Trap with Standpipe (Less than 5 Acres) 82

APPENDIX B **83**
Erosion and Stormwater Runoff Control Regulations 83
Wet Detention Basin D.N.R. Code 1001 83
Land Application of Anionic Polyacrylamide D.N.R. Code 1050 83

APPENDIX C **84**
MMSD Rules and Regulations 84
Chapter 13 Surface Water and Storm Water 84

APPENDIX D **85**
Street Tree Planting and Tree Preservation Regulations 85

APPENDIX E **86**

Notification Policy **87**

APPENDIX F **88**
Chapter 13 Surface Water and Storm Water Reviews 88
Storm Water Management Plan Submittal Checklist 88

~~CHAPTER 1 ..... 1~~

~~SURVEYING ..... 1~~
~~1.0—GENERAL ..... 1~~
~~1.1—HORIZONTAL AND VERTICAL CONTROL ..... 1~~
~~1.2—CONSTRUCTION STAKING ..... 2~~
~~1.3—MONUMENTS ..... 3~~

~~CHAPTER 2 ..... 4~~

~~CONSTRUCTION PLAN REQUIREMENTS ..... 4~~
~~2.0—GENERAL ..... 4~~
~~2.1—PLAN FORMAT ..... 4~~
~~2.2—SUBMITTAL REQUIREMENTS ..... 5~~
~~2.3—SANITARY SEWER PLANS ..... 6~~
~~2.4—WATERMAIN PLANS ..... 7~~
~~2.5—STORM SEWER PLANS ..... 8~~
~~2.6—ROADWAY PLANS ..... 9~~

Formatted: Font color: Text 1

Formatted: Font color: Text 1

Formatted: Font color: Text 1

Formatted: Font color: Text 1

Formatted: Font color: Text 1

2.7 GRADING AND DRAINAGE PLANS 11
2.8 EROSION CONTROL PLAN 12
2.9 STORMWATER MANAGEMENT PLAN 13
2.10 LANDSCAPE PLAN 14
2.11 STREET TREE PLAN 14
2.12 PRELIMINARY PLAT 14
2.13 FINAL PLAT 15

CHAPTER 3 16

ROADWAYS 16
3.0 GENERAL 16
3.1 DESIGN 16
3.2 ROAD GEOMETRY 16
3.3 SUBGRADE 18
3.4 BASE COURSE 19
3.5 HOT MIX ASPHALT (HMA) PAVEMENT 21
3.6 LATE SEASON HMA PAVING CRITERIA 24
3.7 ROADWAY DRAINAGE SYSTEM 24
3.8 CONCRETE CURB AND GUTTER 25
3.9 CONCRETE SIDEWALK 26
3.10 HMA PAVEMENT BIKE & PEDESTRIAN PATH 26
3.11 PAVEMENT REPAIR 26

CHAPTER 4 30

SANITARY SEWER 30
4.0 GENERAL 30
4.1 MATERIALS 30
4.2 MANHOLES 31
4.3 MAINLINE 32
4.4 LATERALS 33
4.5 LATERAL ABANDONMENT 34
4.6 TESTING 35

CHAPTER 5 36

WATER DISTRIBUTION SYSTEM 36
5.0 GENERAL 36
5.1 PIPE MATERIALS 36
5.2 TRACER WIRE 37
5.3 BEDDING, COVER, & BACKFILL 37
5.4 WATER MAIN TRENCH 38
5.5 DEWATERING 39
5.6 DUCTILE IRON WATER MAIN FITTINGS 39
5.7 HDPE WATER MAIN FITTINGS 40
5.8 WATER MAIN FITTING INSTALLATION 40
5.9 THRUST RESTRAINTS 40
5.10 TAPPING SLEEVE 41
5.11 WATER MAIN VALVES 41
5.12 FIRE HYDRANTS 43
5.13 WATER SERVICE LATERAL 44
5.14 CASING PIPE 50
5.15 INSULATION 51
5.16 PIPE INSTALLATION 51
5.17 METER STANDARDS 52
5.18 INTERNAL PRIVATE FIRE PROTECTION 54
5.19 EXTERNAL PRIVATE FIRE PROTECTION 54
5.20 FIRE CISTERNS 55
5.21 TESTING & DISINFECTION 55

~~CHAPTER 6 ..... 58~~

~~GRADING AND DRAINAGE ..... 58~~
~~6.0 — SUBDIVISION GRADING ..... 58~~
~~6.1 — EROSION CONTROL ..... 58~~
~~6.2 — DITCH GRADING ..... 58~~
~~6.3 — STORM SEWER ..... 59~~
~~6.4 — SUMP PUMP DRAINS ..... 60~~
~~6.5 — ON SITE STORM WATER DETENTION ..... 61~~

~~CHAPTER 7 ..... 62~~

~~FILLING AND EXCAVATING ..... 62~~
~~7.0 — GENERAL ..... 62~~
~~7.1 — LAND DISTURBING ACTIVITIES ..... 62~~
~~7.2 — BERMS ..... 63~~
~~7.3 — RECREATIONAL AND AESTHETIC PONDS ..... 64~~
~~7.4 — RETAINING WALLS ..... 65~~

~~CHAPTER 8 ..... 66~~

~~RECORD DRAWINGS ..... 66~~
~~9.0 — GENERAL ..... 66~~
~~9.1 — SANITARY SEWER RECORD DRAWINGS ..... 66~~
~~9.2 — WATER DISTRIBUTION SYSTEM RECORD DRAWINGS ..... 67~~
~~9.3 — STORM SEWER RECORD DRAWINGS ..... 67~~
~~9.4 — GRADING AND DRAINAGE RECORD DRAWINGS ..... 68~~

~~APPENDIX A ..... 1~~

~~Detail Drawings ..... 1~~
~~Figure 1-Typical Residential Street Cross-Sections ..... 1~~
~~Figure 2-Residential Street Cross-Sections (Conservation Subdivisions) ..... 1~~
~~Figure 3-Typical Residential Street Cul-de-sacs ..... 1~~
~~Figure 4-Entrance Island ..... 1~~
~~Figure 5-Acceleration /Deceleration Lanes & Intersection Bypass Lane ..... 1~~
~~Figure 6-Concrete Curb and Gutter ..... 1~~
~~Figure 7-Curb Inlets ..... 1~~
~~Figure 8-Temporary Asphalt curb wedging ..... 1~~
~~Figure 9-Sump Collector Clean Out ..... 1~~
~~Figure 10-Sump Line ..... 1~~
~~Figure 11-Fire Cistern Detail ..... 1~~
~~Figure 12-Bike Path ..... 1~~
~~Figure 13-Concrete Invert ..... 1~~
~~Figure 14-Riprap Flume ..... 1~~
~~Figure 15-Sediment Basin with Standpipe (5 Acres or more) ..... 1~~
~~Figure 16-Sediment Trap with Standpipe (Less than 5 Acres) ..... 1~~

~~APPENDIX B ..... 2~~

~~APPENDIX C ..... 3~~

~~APPENDIX D ..... 4~~

~~Street Tree Planting and Tree Preservation Regulations ..... 4~~

~~APPENDIX E ..... 5~~

~~Notification Policy ..... 6~~

~~APPENDIX F ..... 7~~

~~http://www.mmsd.com/-/media/MMSD/Documents/Rules%20and%20Regs/Manuals/Revised%20Submittal%20Checklist_revNov2010.docx ..... 7~~

~~APPENDIX G ..... 8~~

~~**CHAPTER 1** ..... 1~~

~~**SURVEYING** ..... 1~~
~~1.0 GENERAL ..... 1~~
~~1.1 HORIZONTAL AND VERTICAL CONTROL ..... 1~~
~~1.2 CONSTRUCTION STAKING ..... 2~~
~~1.3 MONUMENTS ..... 3~~

~~**CHAPTER 2** ..... 4~~

~~**CONSTRUCTION PLAN REQUIREMENTS** ..... 4~~
~~2.0 GENERAL ..... 4~~
~~2.1 PLAN FORMAT ..... 4~~
~~2.2 SUBMITTAL REQUIREMENTS ..... 5~~
~~2.3 SANITARY SEWER PLANS ..... 6~~
~~2.4 WATERMAIN PLANS ..... 7~~
~~2.5 STORM SEWER PLANS ..... 8~~
~~2.6 ROADWAY PLANS ..... 9~~
~~2.7 GRADING AND DRAINAGE PLANS ..... 11~~
~~2.8 EROSION CONTROL PLAN ..... 12~~
~~2.9 STORMWATER MANAGEMENT PLAN ..... 13~~
~~2.10 LANDSCAPE PLAN ..... 14~~
~~2.11 STREET TREE PLAN ..... 14~~
~~2.12 PRELIMINARY PLAT ..... 14~~
~~2.13 FINAL PLAT ..... 15~~

~~**CHAPTER 3** ..... 16~~

~~**ROADWAYS** ..... 16~~
~~3.0 GENERAL ..... 16~~
~~3.1 DESIGN ..... 16~~
~~3.2 ROAD GEOMETRY ..... 16~~
~~3.3 SUBGRADE ..... 18~~
~~3.4 BASE COURSE ..... 19~~
~~3.5 HOT MIX ASPHALT (HMA) PAVEMENT ..... 21~~
~~3.6 LATE SEASON HMA PAVING CRITERIA ..... 24~~
~~3.7 ROADWAY DRAINAGE SYSTEM ..... 24~~
~~3.8 CONCRETE CURB AND GUTTER ..... 25~~
~~3.9 CONCRETE SIDEWALK ..... 26~~
~~3.10 HMA PAVEMENT BIKE & PEDESTRIAN PATH ..... 26~~
~~3.11 PAVEMENT REPAIR ..... 26~~

~~**CHAPTER 4** ..... 30~~

~~**SANITARY SEWER** ..... 30~~
~~4.0 GENERAL ..... 30~~
~~4.1 MATERIALS ..... 30~~
~~4.2 MANHOLES ..... 31~~
~~4.3 MAINLINE ..... 32~~

Formatted ...
Formatted ...
Formatted ...

4.4 LATERALS 33
4.5 LATERAL ABANDONMENT 34
4.6 TESTING 35

CHAPTER 5 36

WATER DISTRIBUTION SYSTEM 36
5.0 GENERAL 36
5.1 PIPE MATERIALS 36
5.2 TRACER WIRE 37
5.3 BEDDING, COVER, & BACKFILL 37
5.4 WATER MAIN TRENCH 38
5.5 DEWATERING 39
5.6 DUCTILE IRON WATER MAIN FITTINGS 39
5.7 HDPE WATER MAIN FITTINGS 40
5.8 WATER MAIN FITTING INSTALLATION 40
5.9 THRUST RESTRAINTS 40
5.10 TAPPING SLEEVE 41
5.11 WATER MAIN VALVES 41
5.12 FIRE HYDRANTS 43
5.13 WATER SERVICE LATERAL 44
5.14 CASING PIPE 50
5.15 INSULATION 51
5.16 PIPE INSTALLATION 51
5.17 METER STANDARDS 52
5.18 INTERNAL PRIVATE FIRE PROTECTION 54
5.19 EXTERNAL PRIVATE FIRE PROTECTION 54
5.20 FIRE CISTERNS 55
5.21 TESTING & DISINFECTION 55

CHAPTER 6 58

GRADING AND DRAINAGE 58
6.0 SUBDIVISION GRADING 58
6.1 EROSION CONTROL 58
6.2 DITCH GRADING 58
6.3 STORM SEWER 59
6.4 SUMP PUMP DRAINS 60
6.5 ON SITE STORM WATER DETENTION 61

CHAPTER 7 62

RECORD DRAWINGS 62
7.0 GENERAL 62
7.1 SANITARY SEWER RECORD DRAWINGS 62
7.2 WATER DISTRIBUTION SYSTEM RECORD DRAWINGS 63
7.3 STORM SEWER RECORD DRAWINGS 63
7.4 GRADING AND DRAINAGE RECORD DRAWINGS 64

APPENDIX A 65

Detail Drawings 65
Figure 1-Typical Residential Street Cross-Sections 66
Figure 2-Residential Street Cross-Sections (Conservation Subdivisions) 67
Figure 3-Typical Residential Street Cul-de-sacs 68
Figure 4-Entrance Island 69
Figure 5-Acceleration /Deceleration Lanes & Intersection Bypass Lane 70
Figure 6-Concrete Curb and Gutter 71
Figure 7-Curb Inlets 72

Formatted ...

~~Figure 8-Temporary Asphalt curb wedging~~ ..... ~~73~~
~~Figure 9-Sump Collector Clean Out~~ ..... ~~74~~
~~Figure 10-Sump Line~~ ..... ~~75~~
~~Figure 11-Fire Cistern Detail~~ ..... ~~76~~
~~Figure 12-Bike Path~~ ..... ~~77~~
~~Figure 13-Concrete Invert~~ ..... ~~78~~
~~Figure 14-Riprap Flume~~ ..... ~~79~~
~~Figure 15-Sediment Basin with Standpipe (5 Acres or more)~~ ..... ~~80~~
~~Figure 16-Sediment Trap with Standpipe (Less than 5 Acres)~~ ..... ~~81~~

~~**APPENDIX B**~~ ..... ~~82~~

~~**APPENDIX C**~~ ..... ~~83~~

~~**APPENDIX D**~~ ..... ~~84~~

~~**APPENDIX E**~~ ..... ~~85~~

~~**Notification Policy**~~ ..... ~~86~~

~~**APPENDIX F**~~ ..... ~~87~~

Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1
Formatted: Default Paragraph Font, Font color: Text 1
Formatted: Font color: Text 1

CHAPTER 1

SURVEYING

Formatted: Indent: Left: 0.5", No bullets or numbering

1.0 GENERAL

1.0.1 Surveys shall conform to the provisions of Chapter 236 of the Wisconsin Statutes and all applicable ordinances of the City of Mequon.

1.1 HORIZONTAL AND VERTICAL CONTROL

1.1.1 Horizontal and vertical control shall be maintained throughout the entire project area from the staking of rough grading to final restoration.

1.1.2 Horizontal and vertical control points shall be clearly marked and protected (i.e. lath) during construction.

Formatted: Index 1, Line spacing: single

~~1.1.2~~1.1.3 Second order precision shall be required for vertical control, and the following formula will be used in determining the second order of precision. E = 0.035 ÷√ M; where E = error and M = length of the line in miles.

~~1.1.3~~1.1.4 Vertical control points shall be established at least every 800 feet and within 100 feet of proposed roadway. These control points will be established in accordance with Section1.1.6, 1.1.7, 1.1.8 and 2.1.3 of these specifications.

~~1.1.4~~1.1.5 When plans are submitted for approval to the City Engineer, the Project Engineer will also at this time submit a list of all permanent benchmarks, all temporary benchmarks, a description of their location and the basis or origin of the vertical control network and the error of closure for the entire network. This section must be complied with before the City of Mequon will schedule inspections.

~~1.1.5~~1.1.6 All benchmarks shall be run in from one of the following; listed in priority order.

A. A U. S. Coastal and Geodetic survey monument.

B. A U. S. Public land survey monument and its accompanying reference benchmark.

C. A National Geodetic Survey monument.

D. A City of Mequon GPS monument.

E. A City of Mequon sanitary sewer invert elevation (convert from MMSD datum to mean seal level 1929 adjustment).

~~1.1.6~~1.1.7 Permanent benchmarks shall be set only on the following objects:

A. Concrete door stoops.

B. Concrete headwalls.

C. Existing permanent manhole rim (note: manhole must not be located in the general construction area, nor is it to be affected in any way by the project construction).

D. Fire hydrants on marked flange bolt.

~~1.1.7~~1.1.8 Temporary benchmarks may be set in the following objects.

A. Power poles.

B. Trees 12 inches in diameter or greater - method of attachment indicating the temporary benchmark shall not damage the tree.

~~1.1.8~~1.1.9 Traverse points shall be set only on the following objects:

A. Wooden stakes.

B. Iron pipe.

C. Rebar

D. P-K Nail (only on paved surfaces)

~~1.1.9~~1.1.10 The error in latitude and departure closure for traverses shall be no greater than the ratio of one in 10,000 (1:10,000).

1.2 CONSTRUCTION STAKING

1.2.1 Roadways shall be staked for subgrade and for gravel grade.

A. Staking and construction may be completed utilizing Global Positioning System (G.P.S.) guided equipment thereby eliminating the requirements of 1.2.1B below. If staking and construction is to be done using GPS, stationing shall still be staked in 50’ increments. All lath set to locate the stationing shall also be clearly labeled with the finished centerline grade at each 50’ station. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate subgrade and gravel grade verification. City engineering personnel requested to perform the verification will not attempt to verify the grades if these locations are not clearly marked. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the developer.

B. Subgrade stakes shall be set to the subgrade elevation (blue tops). Gravel grade stakes shall be set to finished gravel grade elevation (red tops). Blue tops at edge of pavement. Red top edge of shoulder.

C. Subgrade and gravel grade staking shall meet the following conditions:

1. Stakes shall be set along the centerline of the roadway and along the edge of shoulder when a rural cross-section is used. When a curb section is to be used, stakes shall be set along the centerline of the roadway and along a line running along the back of curb (subgrade). Subgrade at edge of shoulder gravel.
2. Stakes shall be set at 50' and 100' stations.
3. Stakes shall be set for vertical curves at a maximum of 50' intervals.
4. Stakes shall be set for horizontal curves having a degree of curve greater than 30° at a maximum of 50' intervals.
5. Stakes shall be set at points of curvature, points of tangency, and points on curve opposite the point of vertical intersection, for both horizontal and vertical curves.
6. Stakes shall be set at the intersection point of roadways.
7. Stakes shall be set at edge of pavement radius points by intersections.

8. Lath shall be set next to all roadway stakes and shall have the station labeled with indelible magic marker.
9. Stakes set for gravel grade shall be a minimum of 12" long.

1.2.2 Staking for sanitary sewer/watermain shall be centerline type or on an offset as requested by the contractor and approved by the City Engineer.

1.2.3 Staking for sanitary sewer/watermain shall be done every 25' for the first one hundred feet and every 50.' thereafter.

1.2.4 Manholes shall have stakes at the following locations:

A. Centerline of manhole.

B. Offset (determined by contractor and approved by the City Engineer--minimum 10.0'.

C. Straddle point.

1.2.5 Laser points shall be set by the Project Surveyor. Laser points shall be set in an area that will not be disturbed by the project construction, and still be convenient to the contractor.

1.2.6 Catch basins, and hydrants shall have an offset stake (minimum offset 5.0').

1.3 MONUMENTS

1.3.1 Lot corner monuments (i.e. iron pipe, rebar) shall be pounded flush with existing ground, thus conforming with Wisconsin Statute 236.15 (1).

1.3.2 If a rebar is used to monument a lot corner it shall include a plastic or aluminum survey cap on top which bears the project surveyor's state registration number.

1.3.3 The Southeast Wisconsin Planning Commission (SEWRPC) shall be notified of any USPLSS corners that will be disturbed by construction. Replacement monuments will then be installed by SEWRPC. This will be done at the Developer's expense.

CHAPTER 2

CONSTRUCTION PLAN REQUIREMENTS

2.0 GENERAL

2.0.1 Engineering ~~Department~~ Division approval of the construction plans is required before issuance of a building permit.

A. Engineering Division~~Department~~ approval may also be conditioned upon regulatory permitting for erosion control, storm water and utility extension.

B. Engineering Division ~~Department~~ approval may also require City Attorney review and approval of legal documents including easement declarations, development agreements and maintenance agreements.

2.1 PLAN FORMAT

2.1.1 Plans submitted for approval shall be on "D" size paper. The only exception is the master grading plan. The master grading plan shall not exceed a size of 30" x 36" and shall show the entire development, **including 200' into the surrounding area**. If additional sheets are required match lines shall be used.

2.1.2 Plans shall be drawn to a recognized scale, i.e.: 1"= 40' or 1" = 50' horizontal and 1" = 4', 1" = 5' vertical.

2.1.3 Plans shall use local datum (MMSD datum) in establishing benchmarks and elevations, except in the case where the proposed development lies in the Milwaukee River floodplain. Then, the grading/drainage plan shall use mean sea level datum (USGS datum) in establishing benchmarks and elevations.

2.1.4 Title blocks are required on each plan page and shall include:

A. "Drawn By"

B. "Designed By"

C. "Checked By"

D. "Date"

E. "Scale"

F. "Revised"

G. "Project Name"

H. "Location of Project"

I. "Type of Plan"

2.1.5 All plan sheets shall be signed and stamped by a registered P.E. in the State of Wisconsin. The design engineer shall bear the responsibility for the coordination of submitting all development plans for review.

2.1.6 A cover sheet is required for the plan set. The cover sheet shall include a 1" =200' scale drawing of the project area that shows the locations of the proposed utility improvements. Plan sheets shall be indexed on this 200 scale system plan.

2.1.7 Each cover sheet shall show the locations, elevations, and descriptions of the project benchmarks as established by the project surveyor.

2.1.8 Each plan sheet shall show a north arrow.

2.1.9 Plans shall be completed utilizing a program compatible with ~~AutoCad~~AutoCAD LT~~2010~~ 2015 in DWG format.

2.2 SUBMITTAL REQUIREMENTS

2.2.1 Two (2) full size (24"x36") sets and one ½ size set (12"x18") of all preliminary plans and one .pdf copy shall be submitted for initial review and corrections. Plans requiring state approval, along with support documents, shall be processed through the City. After City review and approval, watermain and well plans shall be processed through the DNR by the project engineer, sanitary sewer plans shall be processed through MMSD and DNR by the City and the storm water management plan shall be processed through MMSD by the City. Necessary reports, (i.e. hydrology, drainage system, etc.) shall be submitted with the plans to facilitate final construction plan approval.

2.2.2 Three (3) sets of approved construction plans which meet all the requirements shall be submitted to the City and the appointed engineering firm at least three working days prior to the preconstruction meeting. Failure to submit plans within the required time frame will result in the cancellation of the preconstruction meeting. These construction plans shall contain the following:

A. Sanitary Sewer Plans

B. Watermain ~~and Pump house~~ Plans

C. Storm Sewer/Sump Pump Collection System Plans

D. Roadway Plans

~~D.~~

E. Master Grading/Drainage Plans

~~E.~~F. Stormwater Management Plan

G. Erosion Control Plan

H. Signage and Pavement Marking Plans

I. Landscape Plan

J. Street Tree Plan

~~F.~~

~~G.~~K. Detail Sheet

2.2.3 If details are needed for any sets of construction plans, a separate detail sheet shall be provided.

2.2.4 A minimum of three working days shall be required for approval of any revisions or changes to previously approved plans. The approval shall be in writing from the City Engineer. No construction related to these proposed revisions or changes shall proceed prior to the approval of such revisions.

2.2.5 Preliminary proposed and existing grading plans (with plan view of preliminary sanitary sewer) shall be reviewed prior to all other preliminary construction plans being submitted. Complete detail on detention/retention objectives should be shown.

2.2.6 Failure to provide any of the above required information in the format requested WILL result in the immediate disapproval and return of the plans. This may result in removal of the item from any upcoming committee or commission agenda.

2.3 PUBLIC AND PRIVATE SANITARY SEWER PLANS

2.3.1 Each sanitary sewer plan and profile sheet shall show the following:

A. Plan View

1. Right-of-way and its width.
2. Edge of pavement or face and back of curb and sidewalk where applicable.
3. All easement limits and widths.
4. Proposed or existing watermain, laterals and hydrants (existing-dashed, proposed-solid).
5. Proposed and existing sanitary sewer, manholes and laterals.
6. Dimensions showing offset from right-of-way to the sewer line and separation between the sanitary sewer and other utilities.
7. Distance between manholes and between each sanitary sewer lateral.
8. Length of each sanitary sewer lateral and length of any lateral risers.
9. Size of proposed sanitary sewer.
10. Lot lines, lot and block numbers and frontages.
11. Name of each roadway and any intersecting roadways in which the sanitary sewer will be located.
12. An estimate of all material quantities to be used in the construction of the sanitary sewer.
13. A note warning that underground utilities should be staked out by "Diggers Hotline".
14. A north arrow
15. A signed stamp of the design engineer.
16. A title block conforming to Section2.1.4~~2.1.4~~.
17. All culvert locations (proposed and existing)
18. Numbered manholes
19. Material and size of any existing sewer
20. Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).
21. All improvements are stationed
22. All obstructions/appurtenances located within the project limits including but not limited to trees, signs, utilities, fences, light poles, structures, etc.

B. Profile View

1. Existing and proposed surface profiles over the sanitary sewer.

2. The proposed size and diameter of sanitary sewer manholes (inches) for existing and proposed.
3. Manhole numbers, rim and invert elevations.
4. Slope and size of sanitary sewer between each manhole.
5. The proposed watermain and its size (dashed).
6. Culverts and their inverts and sizes (proposed and existing).
7. Limits of granular, spoil, and/or slurry backfill.
8. Distance between manholes
9. Material and size of any existing sewer to be tied into.
10. Material choices of new sanitary sewer.
11. Stationing

2.4 WATERMAIN PLANS

2.4.1 This design standard covers acceptable designs for ~~water main~~watermain construction. Local, State, and Federal regulations supersede the requirements of this standard. Design parameters not included in this standard or that deviate from this standard must be approved by the City of Mequon Water Utility Planning Engineer (Engineer) prior to final submission. An 'owner letter' will only be provided after Water Utility Planning Engineer has approved the ~~water main~~watermain drawings. The owner letter is required before the WDNR will accept the submittal of ~~water main~~watermain plans for their approval.

2.4.2 Design Plan Requirements

A. Plan and profile drawings are required for all water~~-~~main designs.

B. Water~~-~~main plan and profile drawings shall be 20, 40, or 50 scale.

C. Each water~~-~~main design shall be tied to an alignment that is the center of right-of-way, center of easement, or property line.

D. Plan and profile sheet shall show the designed offset from the alignment to the water main at every 50 foot station and pipe deflection.

E. State Plane Coordinate system, and USGS elevation datum shall be used for alignment and elevation information.

2.4.3 Watermain Location and Requirements

A. ~~Water main~~Watermain in public right-of-way

1. Water~~-~~main shall be located a minimum of six feet from pavement edge.
2. Water~~-~~main shall be located in the north and east half of the public right-of-way if required separations from other utilities, waterways, wetlands, drain field's, and other conflicts can be met.
3. The centerline of the water~~r~~ main shall not be closer than 20 feet from a building foundation.

B. Water~~-~~main in private easement

1. The water~~-~~main shall be located at the center of a 20 foot easement.
2. The centerline of the water~~-~~main shall not be closer than 20 feet from a building foundation.

C. High points in a water~~-~~main must be located at hydrants.

2.4.4 Each watermain plan and profile sheet shall show the same information as the Sanitary sewer plan and profile sheet and include the following:

~~D.~~A. Plan View

1. Dimensions showing separation between the watermain and sanitary sewer and other utilities.
2. Size of proposed watermain.
3. An estimate of all material quantities to be used in the construction of the watermain totaled on the last page.

~~E.~~B. Profile View

1. Existing and proposed surface profiles over the proposed watermain.
2. Material, slope, diameter, and length of waterman between grade breaks, and fittings.
3. The sanitary sewer and its size (dashed).
4. Culverts and their inverts and sizes (proposed and existing).
5. Limits of granular, spoil, and/or slurry backfill.
6. Stationing.

2.5 STORM SEWER PLANS

2.5.1 Each storm sewer plan and profile sheet shall show the following:

A. Plan View

1. Right-of-way and its width.
2. Edge of pavement or face and back of curb and sidewalk.
3. All easement limits and widths.
4. Proposed or existing sanitary sewer and laterals (existing-dashed, proposed-solid).
5. Proposed or existing watermain and laterals (existing-dashed, proposed-solid).
6. Proposed size and diameter of manholes, storm sewer, catch basins, and junction boxes.
7. Dimensions showing offset from right-of-way to the storm sewer.
8. Length and size of storm sewer between catch basins and junction boxes.
9. An estimate of all material quantities to be used in the construction of the storm sewer.
10. Lot lines, lot and block numbers and frontages.
11. Name of each roadway and any intersecting roadways in which the storm sewer will be located.
12. A note warning that underground utilities should be staked out by "Diggers Hotline".
13. A north arrow.
14. A title block conforming to Section 2.1.4.
15. Material and size of any existing storm sewer to be tied into.
16. Details of outfall or ditch inlet protection requirements such as rip-rap, end sections or headwalls as needed.

17. Location of sump pump collection system and construction elevations and details.
18. Pump house drain system.
19. Stationing.
20. All obstructions/appurtenances located within the project limits, including, but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

B. Profile view

1. Existing and proposed surface profiles over the storm sewer.
2. The proposed size and diameter of manholes, storm sewer, catch basins, and junction boxes.
3. Distances, slope and size of storm sewer between catch basins and junction boxes.
4. Rim and invert elevations at catch basins and junction boxes.
5. Material and size of any existing storm sewer to be tied into.
6. Sanitary sewer (dashed).
7. Watermain (dashed).
8. Material choices of new storm sewer.
9. Stationing

2.6 ROADWAY PLANS

2.6.1 Each roadway plan and profile sheet shall show the following:

A. General

1. A separate detail sheet shall be required for the roadway plans. This detail sheet shall show a typical roadway cross-section, a typical cul-de-sac cross-section, an "eyebrow" cross-section, and any sump pump drainage system details.
2. Specific cross-section(s) and details along with specifications must be shown if not supplied elsewhere in plan set.

B. Plan View

1. Right-of-way and its width.
2. Edge of pavement face and back of curb and sidewalk.
3. Stationing along the centerline of the roadway, including cul-de-sacs and "eyebrows".
4. Width of pavement.
5. Lot lines, numbers and frontages.
6. Name of each roadway and any adjoining roadways.
7. All culvert locations and their sizes and invert elevations.
8. The limits of any areas which need special stabilization techniques.
9. Radii of all intersections (edge of pavement or back of curb).
10. An estimate of all material quantities to be used in the construction of the roadway.
11. A north arrow.
12. A title block conforming to Section2.1.4~~2.1.4~~.
13. Specific details of all existing roadways being connected to. Pavement, shoulders, ditches, curb alignment and grades shall be shown as needed to adequately make the transition.

14. All driveways within 100' of the proposed development.
15. All roadside ditch locations, flowline elevations at 100' intervals, and slope of the ditch including arrows showing the direction of flow.
16. All obstructions/appurtenances located within the project limits including but not limited to: trees, signs, utilities, fences, light poles, structures, ~~etc~~etc.
17. Roadway Signage location, ~~and~~ signage type, and dimensions.
18. Sign pole installation materials and details.
~~17.~~ Pavement marking color, material, orientation, location and
19. ~~Flange~~size.
~~18.~~20. Flange line elevations at even 50 foot station intervals for urban section roadways.
~~19.~~21. For cul-de-sacs, provide spot elevations to demonstrate the transition between the crown of the main road and superelevation of the cul-de-sac.
~~20.~~22. Slope Intercepts.

C. Profile View

1. Existing and proposed roadway profiles along centerline of roadway, cul-de-sacs and "eyebrows".
2. Stationing and final centerline grades at all fifty and hundred foot stations and at all grade breaks.
3. Stationing and final centerline grades at all PC's, PT's PVI's, and POC's at PVI's for vertical and horizontal curves.
4. All culverts with their sizes and inverts shown.
5. Slope of the roadway between each grade break.
6. Limits of any areas which need special stabilization techniques.

D. Cross Sections

1. Cross sections shall be provided for all new roads and for improvements to existing roads.
2. Cross section sheets shall follow all other plan sheets and shall be arranged in same general order as road plan sheets.
3. Cross sections shall read up the sheet (lowest station at bottom). Two columns of sections may be placed on the same sheet provided sections do not overlap. Where two columns are used, lowest station at bottom of left column, highest station at top of right column.
4. The following cross section information must be shown:

    a. Sections shown at 50' stations, cross culverts, driveways, intersections, and quadrants of cul-de-sacs
    b. Scale: 1" = 10' Horizontal and 1” = 5’Vertical, 1” background grid shown
    c. Station indicated to the right of each section in bold.
    d. Right of way lines shown and labeled
    e. Offset distances, left and right, noted at 10 foot intervals at bottom of each column only and extending 10’ beyond right of way or 10’ beyond limit of construction whichever is greater
    f. Existing ground line shown in dashed line
    g. Improvements shall be indicated with solid lines and clearly labeled
    h. Final pavement elevation at the centerline of the street or roadway

i. Invert elevation of ditches and flowline elevation of the gutter
j. Slope intercepts shall be clearly labeled by station, elevation to the nearest 0.1', and offset distance (left or right) from the reference line
k. Any existing paving to be removed shown with cross hatching and labeled
l. Easements beyond right of way shown, labeled and dimensioned
m. Sidewalk (if required) shown

2.7 GRADING AND DRAINAGE PLANS

2.7.1 The Master Grading/Drainage Plan shall show the following:

A. Subdivision boundary lines and all lot lines.

B. Adjoining and inclusive roadways and their names.

C. Contour lines at 2' intervals. These contour lines shall extend at least 200' into adjacent parcels, except when the adjacent topography is critical to the proposed development, then the contour lines shall extend 400' into adjacent parcels. The contours shall be adequate enough to assess the potential impact of the proposed development on existing homes or businesses. Existing contour lines shall be dashed while proposed contour lines shall be solid.

D. Limits of 100 year floodplain, and watercourses affected by the proposed development.

E. Location and dimensions of stormwater drainage systems and natural drainage patterns on and immediately adjacent to the site for 200'.

F. Locations and dimensions of existing; utilities, structures, roads, highways, paving, lot lines and outlots.

G. Existing culvert locations, invert elevations, and sizes within 200' of the proposed development.

H. Existing and proposed culvert locations, invert elevations, sizes, and materials within the proposed development.

I. Existing storm sewer locations, invert elevations, sizes, and materials within 200' of the proposed development.

J. Existing or proposed storm sewer locations invert elevations, sizes, and materials within the proposed development.

K. Location of topsoil stockpile.

L. A separate plan sheet showing erosion and sedimentation control measures and details.

M. Typical building pad locations for each lot which incorporate setbacks and offsets and show finished yard grade elevations to the nearest tenth of a foot for each lot.

N. A north arrow.

O. A title block conforming to Section 2.1.4.

P. Proposed elevations at all property corners.

Q. Show all high points and low points with an elevation.

R. Notes required to properly sequence the construction activities (i.e. erosion and grading which must be done ahead of other operations on site to manage storm water runoff).

S. Specific details on all retention/detention basins, ponds, overflows, etc.

T. Obstructions within the project limits including but not limited to: trees, landscaping, fences, structures, light poles, etc.

2.7.2 Driveway Culvert Plan

A. The Master Grading/Drainage Plan shall include a table or map identifying the driveway culvert size.

B. If the specific driveway location is known, the inverts of the driveway culverts must be provided.

C. If the specific driveway location is unknown, spot elevations shall be provided for the centerline of the ditch at each lot line.

2.7.3 Finished Floor Elevations

A. The Master Grading/Drainage Plan shall indicate the proposed Top of Foundation and Finished Yard elevations.

2.8 EROSION CONTROL PLAN

As required by City of Mequon Code of Ordinances: Chapter 58 – Planning and Development Regulations, Article VIII. – Erosion and Stormwater Runoff Control

2.8.1 The erosion control plan shall show the following:

A. Site boundaries and adjacent lands.

B. A map showing existing topography of the proposed site and adjacent properties. Site contour interval may not exceed two feet. Topographic contours shall be field surveyed.

C. Vegetative cover and soil type.

D. Limits of 100 year floodplain, and watercourses affected by the proposed development.

E. Location and dimensions of stormwater drainage systems and natural drainage patterns on and immediately adjacent to the site for 200'.

F. Locations and dimensions of existing; utilities, structures, roads, highways, paving, lot lines and outlots.

G. Proposed conditions of the site shall include:

1. Locations and dimensions of all proposed land disturbing activities, including finished topography.
2. Location and dimensions of all temporary soil and dirt stockpiles.
3. Location and dimensions of all construction site control measures necessary to meet the requirements of the City of Mequon erosion control ordinance. Construction details should be shown on the plan.

4. Location, dimensions and description of all channels, pipes, structures, basins or reservoirs, or other conveyances proposed to carry runoff to the nearest adequate outlet, including applicable design assumptions and computations. The application, design discharge rate, in cubic feet per second, for each structure, pipe, channel, or conveyance. Design flow velocity for channels and outlets shall be indicated.
5. Areas to be sodded or seeded and mulched or otherwise, stabilized with vegetation, describing type of final vegetative cover. Type and quality of mulch and method of anchoring shall be indicated, as well as seeding mixtures, rates, lime and fertilizer application rate for temporary or permanent seeding.
6. Schedule of anticipated starting and completion date of each land disturbing and land developing activity including the installation of construction site control measures needed to meet the requirements of the City of Mequon proposed erosion control ordinance.
7. Provisions for maintenance of the construction site control measures during construction.

2.9 STORMWATER MANAGEMENT PLAN

As required by City of Mequon Code of Ordinances: Chapter 58 – Planning and Development Regulations, Article VIII. – Erosion and Stormwater Runoff Control

2.9.1 Highlight drainage basins and specify acres of each basin.

2.9.2 Presettlement (new development) or existing conditions (redevelopment) and post development peak flows in cubic feet per second at each stormwater exit point.

2.9.3 Label basins by using letters, cross reference in report.

2.9.4 Spillway/outfall structures, size, materials and construction methods.

2.9.5 Flood routing for runoff greater than design capacity.

2.9.6 Flood stage elevation of 100 year 24 hour storm event.

2.9.7 Accompanying the plan shall be a signed Engineering Report summarizing: design assumptions, conclusions, calculations, and recommendations.

2.9.8 MMSD Chapter 13 Approval

A. Upon receipt of approval from the City or its consultant, submit the following:

1. Three copies of the final storm water management plan to be stamped approved. One copy for the City, one for the MMSD submittal and one for the owner.
2. Two copies of a completed Chapter 13 Surface Water and Storm Water Reviews Storm Water Management Plan Submittal Checklist.

3. The final submittal shall include a Maintenance Plan and Responsible Party Designation, including:

   i. Maintenance plan
   ii. Identification of responsible party
   iii. Funding source
   iv. Signed letter

2.10 SIGNAGE AND PAVEMENT MARKING PLAN

2.10.1 Each signage plan sheet shall show the following:

A. Right-of-way and its width.

B. Edge of pavement or face and back of curb and sidewalk where applicable.

C. All easement limits and widths.

D. Utility locations.

E. Location of all existing roadway and directional signs and pavement marking.

F. Location of all proposed roadway and directional signs and pavement marking.

G. Size, style and installation details of each sign

H. A north arrow

Formatted: Index 2

~~2.10~~2.11 LANDSCAPE PLAN

~~2.10.1~~2.11.1 Refer to Appendix D.

~~2.11~~2.12 STREET TREE PLAN

~~2.11.1~~2.12.1 Refer to Appendix D.

~~2.12~~2.13 PRELIMINARY PLAT

~~2.12.1~~2.13.1 Two (2) copies of a preliminary plat shall be submitted with the other required preliminary plans for initial review.

~~2.12.2~~2.13.2 Three (3) copies of an approved preliminary plat conforming to Section 236.11 (1)(a) of the Wisconsin Statutes shall be required at least three days prior to the start of any construction. A digital file compatible with AutoCAD LT 2015 in DWG format shall also be submitted.

~~2.13~~2.14 FINAL PLAT

~~2.13.1~~2.14.1 The final plat will not be certified by the City until conditions of the development agreement are met.

~~2.13.2~~2.14.2 One (1) full size 24" x 36" and one (1) 8½"x11" 200 scale copy of the final plat on 4 mil thick double matte mylar conforming to Section 236.25 (2)(c) and (d) of the Wisconsin Statutes shall be submitted to the City within 10 days of recording. Copies shall be a black line mylar. A digital file compatible with ~~AutoCad~~AutoCAD LT 2015~~0~~ in DWG format shall also be submitted.

CHAPTER 3

ROADWAYS

3.0 GENERAL

3.0.1 Work performed shall conform to the latest editions of the "State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction", hereinafter referred to as the "State Specifications" and the Standard Specifications for Land Development in the City of Mequon. Variations from the standards outlined below will be entertained on a case by case basis.

3.1 DESIGN

3.1.1 A geotechnical firm shall be retained by the Developer to test and evaluate existing conditions and subsurface soils in the area of the planned roadways to make recommendations for both the subgrade and the pavement structure required.

3.1.2 The Developer shall provide a pavement design prepared by a Wisconsin P.E. meeting both AASHTO and WisDOT design standards as well as complying with these specifications.

A. Pavement design shall be based both on the geotechnical report and the projected traffic loading for a 20 year design life.

B. City of Mequon residents have the choice of three separate privately owned garbage collection service providers, so the potential for up to three separate garbage haulers using the streets every week shall be taken into account for the pavement design.

3.1.3 For cul-de-sacs, provide spot elevations to demonstrate the transition between the crown of the main road and superelevation of the cul-de-sac.

3.2 ROAD GEOMETRY

3.2.1 Longitudinal grades of City owned roadways shall not exceed 10% on local roads and 6% on secondary and major streets. Longitudinal grades shall not be less than 0.5%.

3.2.2 Horizontal Curves. A minimum sight distance with clear visibility, measured along the centerline, shall be provided of at least three hundred feet (300) on major streets, two hundred feet (200) on secondary streets and one hundred twenty feet (120) on all other streets.

3.2.3 Tangents. A tangent of at least one hundred (100) feet long shall be introduced between reverse curves on major and collector streets.

3.2.4 Vertical Curves. All crest vertical curves shall be designed in accordance with Exhibit 3-73 of AASHTO: A Policy on Geometric Design of Highways and Streets, latest version. All sag vertical curves shall be designed in accordance with Exhibit 3-75 of AASHTO: A Policy on Geometric Design of Highways and Streets, latest version.

3.2.5 Subdivision intersection radii shall be 25 feet to the back of curb for an urban section roadwa~~a~~y and 30 feet to the pavement edge for rural section roadways.

3.2.6 Arterials, Collectors, and Intersections

A. Any new construction of, extensions of, or connections to any arterial or connector streets and/or intersections shall be designed to appropriate AASHTO, WisDOT, Ozaukee County, or City of Mequon design standards.

B. The design of these improvements requires approval by the jurisdictional authority of the roadway the development is connecting to as well as the City of Mequon. Local residential street design falls under the standard cross-section design described below in Section 3.2.7.

3.2.7 Standard Cross-Sections

A. Pavement width for standard residential streets shall be 22 feet. Conservation subdivision streets shall be 20 feet wide. See Appendix A, Fig. 1-3.

B. Roadside ditches for the standard residential streets without curb shall be located 23 feet from the road centerline and 64 feet from the center of any cul-de-sac. Roadside ditches for conservation subdivision streets shall be 21 feet from the road centerline and 63 feet from the center of any cul-de-sac. See Appendix A, Fig. 1-3

C. Roadway subgrade and pavement surface for all streets shall have a cross slope of 3% and a minimum 0.5% centerline profile gradient.

~~D. Minimum intersection radii for residential streets shall be 30 feet.~~

D. All new subdivision entrances shall require acceleration/deceleration lanes, a bypass lane and an entrance island. See Figure 5 in Appendix A. A bypass lane on the existing intersecting roadway is required. Refer to Section 3.5 for paving requirements.

~~3.2.8~~

3.2.8 Private Driveways and Roadways

Formatted: Index 1

A. Private driveways serve a maximum of 4 lots and extend less than 500-feet in length.

B. A private roadway can serve up to 10 lots and ~~and be up~~extend -up to 1,000-feet in length.

C. A private roadway and shared private driveway shall have a minimum pavement width of 18 feet with 2 foot aggregate shoulders. A 3-foot clear zone, as defined by the WisDOT FDM, is required.

D. Private roadways shall follow City of Mequon public roadway standards for subgrade, base course and hot mix asphalt.

E. Private roadways shall terminate with a cul de sac. The cul de sac shall have a radius of 50-feet. See Appendix A, Fig. 1-3

F. Private driveways and private roadways require shared access easement agreements to benefit all adjacent lots.

3.2.9 Intersection Sight Distance (ISD),Vision Triangles, and Vision Corners

A. Where new subdivision entrance roads intersect with existing city streets, county or state highways, or other existing roadways, vision corners consisting of the proper clear sight window for the intersection sight distance and the vision triangles meeting

the requirements of State of Wisconsin, Department of Transportation's (WISDOT) Facility Development Manual (FDM) Chapter 11, Section 10-5.1 shall be required.

Formatted: Indent: Left: 1.5", No bullets or numbering

B. The clear sight window shall be designed based on the type of intersecting road and vehicles listed in FDM table 5.1 and intersection sight distances from FDM table 5.2.

C. The dimensions of the vision triangles shall meet the design guidelines of FDM 11-10 Attachment 5.13

3.3 SUBGRADE

3.3.1 Compaction

A. The subgrade shall be rolled and compacted to meet a 95% modified proctor density.

B. The City reserves the right to perform or have performed by an independent soils firm, nuclear density tests on areas of subgrade that appear suspect. If the tests prove compaction is acceptable, the City shall bear the cost of the soil testing. If the tests prove compaction was below acceptable standards, the area or areas in question shall be reworked and reinspected/retested. The developer shall then bear the cost of all testing performed.

3.3.2 Proof Roll

A. Prior to the installation of stone, the subgrade shall pass a proof rolling with a fully loaded quad-axle dump truck acceptably loaded as approved by the City.

B. Proof roll deflections up to1½ inches deep may be corrected with the use of an appropriate geotextile fabric or geogrid between the subgrade and the base course. Deflections greater than 1½ inches shall result in a failed proof rolling and shall require other methods to resolve the problem.

C. Deflections greater than 1 ½ inches will result in a failed proof roll.

1. In the case of a failed proof roll, the geotechnical firm who performed the soils analysis shall be called upon to make recommendations as to the methods required to stabilize the subgrade.
2. After stabilization, the failed areas will require a passing proof roll to be accepted.
3. All costs associated with this work will be paid for by the Developer.

D. Proof rolling shall be scheduled with the Engineering Division~~Department~~ one day prior to accomplishment and shall not occur unless witnessed by a representative of the Engineering Division~~Department~~.

E. The full thickness of roadway base course as detailed in the roadway typical section shall be placed upon the approved roadway subgrade within twenty four (24) hours of a proof roll. If any rain occurs within the twenty four (24) hour period after a passing proof roll, the roadway shall be proof rolled again at the engineer's discretion.

3.3.3 Grade Check

A. The City requires an inspection and grade check of the subgrade before the stone base may be applied.

B. The grade check is completed by the City of Mequon Engineering Division ~~Department~~ and will be billed to the Developer.

C. Grade checking entails shooting grades along the proposed roadway centerline at fifty (50) foot intervals, and along the proposed edge of pavement.

D. A tolerance of ±.1 foot from the proposed subgrade elevations shall be allowed provided the minimum cross slope of subgrade is maintained.

E. The project surveyor is responsible for the horizontal and vertical control for the entire project.

1. If stakes are missing or the contractor feels that a wrong grade has been set on some of the subgrade stakes the contractor is to contact the project surveyor.
2. The project surveyor is required to set subgrade stakes to the subgrade elevations for the contractor.
3. These stakes are to be set along the centerline of road and along the edge of shoulder where there is no curb.
4. If the street is to have curb, then stakes shall be set along the centerline of road and along a line running along the back of curb.
5. If project surveying and construction is performed with GPS guided equipment negating the requirement of subgrade staking, finished centerline grades shall be clearly labeled on all stationing lath.
6. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate subgrade grade checks.
7. City Engineering personnel requested to perform the grade check will not attempt to verify the grades if these locations are not clearly marked.
8. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the Developer.

F. The contractor responsible for the subgrade grading shall conform to the notification policy of the City of Mequon. (See Appendix E.)

3.3.4 Subgrade material shall be dry before the City will allow the gravel base to be applied.

3.4 BASE COURSE

3.4.1 Materials

A. The base course for the roadway shall meet all of the requirements in State Specifications, Section 305.

B. Base material gradations and layer thicknesses are determined from the approved pavement design, but shall have a minimum total required base thickness of 12 inches.

C. A current sieve analysis for each grade, size or type of base material shall be submitted to the City prior to installation.

D. Any nonconforming base material or base material arriving on site prior to the submittal of the sieve analysis shall be removed at the Developer's expense.

E. The base material is to be installed and compacted in lifts as dictated by the approved pavement design.

F. All closed circuit television inspection of the sanitary sewer is to be completed before the top layer of aggregate base material is installed.

3.4.2 Compaction

A. Base course material shall be compacted to 95% of the modified proctor.

~~A.~~

Formatted: Normal

B. The City reserves the right to conduct compaction tests performed at random using a nuclear density meter to determine if compaction specifications have been achieved and if subsequent paving will be permitted.

1. An independent firm selected by the Developer and approved by the City shall perform a modified proctor test on base course material taken from the job site. These test results shall be submitted to the City within 24 hours of sampling.
2. All costs associated with the compaction testing shall be paid for by the developer.

3.4.3 Proof Roll

A. Prior to HMA paving, the base course shall pass a proof rolling with a fully loaded quad-axle dump truck.

B. If any areas show movement, deflection, or pumping, the proof roll will be considered to have failed and paving will not be allowed.

C. All costs associated with the work required to produce a passing base course proof roll will be paid for by the Developer.

D. Proof rolling shall be scheduled with the Engineering Division~~Department~~ one day prior to accomplishment and shall not occur unless witnessed by a representative of the Engineering Division~~Department~~.

3.4.4 Grade Check

A. The City of Mequon requires inspection and grade check of the base course before the first layer of asphalt can be placed.

B. This inspection and grade check is done by the City of Mequon Engineering Division~~Department~~ and will be billed to the Developer.

C. Grade checking entails shooting grades along the proposed roadway centerline, and along the edge of pavement. The tolerance for stone base elevations is ±0.05 feet from the proposed elevations.

D. The project surveyor is responsible for the horizontal and vertical control for the entire project.

1. If stakes are missing or the contractor feels that a wrong grade has been set on some of the subgrade stakes the contractor is to contact the project surveyor.
2. The project surveyor is required to set subgrade stakes to the subgrade elevations for the contractor.
3. These stakes are to be set along the centerline of road and along the edge of shoulder where there is no curb.

4. If the street is to have curb, then stakes shall be set along the centerline of road and along a line running along the back of curb.
5. If project surveying and construction is performed with GPS guided equipment negating the requirement of subgrade staking, finished centerline grades shall be clearly labeled on all stationing lath.
6. Centerline and edge of shoulder or back of curb shall also be clearly located in the field to facilitate stone base grade checks.
7. City Engineering personnel requested to perform the grade check will not attempt to verify the grades if these locations are not clearly marked.
8. Any time spent traveling to jobsite and determining that these locations are not marked properly will be billed to the Developer.

3.4.5 Shoulders

A. The base course material shown in the approved pavement design shall extend out to the outside edge of the shoulder and extend from edge of shoulder toward ditch at no steeper than a 2:1 slope.

B. After asphalt pavement is installed, the top layer of the shoulder shall be placed at a 4% slope away from the pavement with ¾" dense graded base material for main roads and 3/8" dense graded base for subdivision roads meeting the requirements of Section 305 of the State Specifications.

C. Shoulders shall be compacted using ordinary compaction methods resulting in a smooth shoulder that is flush with the edge of pavement.

3.5 HOT MIX ASPHALT (HMA) PAVEMENT

3.5.1 General

A. Work under this section shall, unless otherwise directed by the City Engineer or by these specifications, comply with Sections 450, 455, 460, and 465 of the "State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction", hereinafter referred to as the "State Specifications".

3.5.2 Notification

A. The paving Contractor shall notify the City as per the notification policy of the City of Mequon prior to commencement of any HMA paving. (See Appendix E.)

3.5.3 Inspection

A. The City requires an approved full-time City inspector located at the job site whenever any HMA pavement is being constructed.

B. All costs associated with this inspection will be billed to the Developer.

C. HMA pavement installed without city inspection will be rejected. Rejected pavement will require removal and replacement at the developer's expense, including cost of an additional grade check of the stone base prior to re-paving.

3.5.4 Upper and Lower Layers

A. The total HMA pavement thicknesses shall be determined by the approved pavement design, but shall have a minimum required total pavement thickness of 4 ~~inches .~~ inches.

B. The City of Mequon requires a lower layer gradation of 19mm, and an upper layer gradation of 9.5mm. As such, the HMA paving layer thicknesses may have to be adjusted to meet both the approved pavement design total thickness and the minimum and/or maximum layer thicknesses allowed by State Specifications for each gradation being paved.

Formatted: Normal

~~B.~~

3.5.5 Acceleration/Deceleration and Bypass Lanes

A. At the entrance to the new subdivision or development, acceleration, deceleration and bypass lanes, shall be constructed in accordance with Figure 5 in Appendix A.

3.5.6 Centerline Joint

A. Unless otherwise directed by the City Engineer, the contractor shall use a tapered and notched longitudinal centerline joint on the lower layer of paving. The joint shall conform to Figure 5, Procedure 14-10-5 of the State of Wisconsin, Department of Transportation's Facility Development Manual, or a City of Mequon approved equivalent.

3.5.7 Mixture Design

A. A mixture design for each material being placed conforming to the requirements of State Specifications, Section 460, must be submitted to the City a minimum of 3 working days prior to any paving being performed. If no mix design is submitted, paving will not be allowed.

B. The mixture requirements for both the upper and lower layers shall meet the requirements for mixture type ~~E-0.3~~LT as shown in table 460-2 of the State Specifications, unless otherwise dictated by the approved pavement design or directed by the City Engineer.

C. Asphaltic Binder shall be performance grade (PG) asphalt meeting the requirements of State Specifications, Section 455 and shall be grade PG 58-28, unless otherwise dictated by the approved pavement design or directed by the City Engineer.

D. The gradation for the lower layer shall be nominal size 19.0 mm, and for the upper layer shall be nominal size 9.5 mm meeting the requirements shown in the aggregate gradation master range (table 460-1) found in the latest edition of State Specifications.

3.5.8 Compaction methods shall conform to State Specifications, Section 450.3.2.6.1. Compaction of all traffic lanes, paved shoulders, and paved bike lanes (upper and lower layers) shall meet minimum density requirements shown in table 460-3 of the State Specifications. Target maximum density shall be determined using the Maximum Density Method as described in State Specifications, Section 460.3.3. Target maximum density is the Maximum Specific Gravity (G_{mm}) of the material multiplied by 62.24.

A. The paving contractor shall provide, at the contractor's expense, a nuclear density technician certified at level 1 of the State of Wisconsin "Highway Technician Certification Program" to perform density testing. Density testing shall conform to the procedures of the State of Wisconsin, Department of Transportation's "Construction and Materials Manual". This testing shall be performed as soon as

practical after compaction and before placement of subsequent layers. Density determinations shall be in accordance with State Specifications, Section 460.3.3.2, with the following exceptions:

1. A "lot" shall represent a maximum of 300 tons of a mixture placed within a single layer for each location. If any location/street is less than 300 tons, that street/location shall represent one lot.
2. The locations for the five tests per lot shall be arbitrarily spaced throughout the length of the lot, and at varying offsets from the edge of pavement.
3. A penalty will be charged by the City of Mequon to the Developer for each 300 ton lot not meeting the target maximum density according to the following table:

PENALTY FOR DENSITIES BELOW MINIMUMS

PERCENT LOT DENSITY BELOW SPECIFIED MINIMUM	PENALTIES (PER 300 TON LOT)
From 0.5 to 1.0 inclusive	2% CCP*
From 1.1 to 1.5 inclusive	5% CCP*
From 1.6 to 2.0 inclusive	9% CCP*
From 2.1 to 2.5 inclusive	15% CCP*
From 2.6 to 3.0 inclusive	30% CCP*

* - CCP(City Contract Price) – The CCP shall be determined from the previous year's City of Mequon annual "Road Improvements" contract price per ton multiplied by 300 for each 300 ton lot of the upper or lower layer being paved. 4% shall be added to this price for inflation.

If any of the individual tests for a particular lot is more than 3% below the minimum required density in State Specification, Table 460-3, additional testing will be performed to determine the extent of the unacceptable material. The unacceptable area and tonnage will be determined by the City of Mequon in cooperation with the paving contractor's nuclear density technician. The density of the remainder of that particular lot will be the average of the original passing tests for that lot.

Payment of the penalty or removal and replacement with acceptable pavement will be required before final plat will be recommended.

3.5.9 The City requires that any asphalt to be placed on a roadway in the City of Mequon arrive at the job site at a temperature within 20°F of the temperature recommended by the asphalt supplier. The inspector will periodically test the load temperature of the arriving trucks. Loads not falling within the guidelines for HMA temperatures will be rejected.

3.6 LATE SEASON HMA PAVING CRITERIA

3.6.1 HMA pavement upper layer installation shall not be permitted after October 15th.

~~A.~~3.6.2HMA pavement lower layer installation shall not be permitted after November 15th.

Formatted: Index 1

~~B.~~A. HMA pavement lower layer installed after November 1 shall require an escrow to be established equal to 125% of the total cost of the pavement installed. This escrow can

be used to repair any pavement failures occurring before placement of the final HMA pavement upper layer which may have been caused by adverse conditions present during (late season) paving.

~~C.~~B. Paving of HMA pavement lower layer shall not be permitted, regardless of date, unless air temperature is 32°F and rising at the start of paving operations and the stone base is not frozen. Paving of HMA pavement upper layer shall not be permitted, regardless of date, unless air temperature is 40°F or rising.

~~3.6.2~~3.6.3 HMA paving shall not be permitted on wet or frozen gravel bases or in the rain.

3.7 ROADWAY DRAINAGE SYSTEM

3.7.1 Ditches

A. Minimum flowline slope of one percent (1%).

B. Located as per the standard residential cross-section of the City of Mequon. (See Figure 1,2 and 3 in Appendix A)

C. Minimum finished depth of 27" and a maximum finished depth of 39", measured from the centerline. Any roadside ditches deeper than 39" shall ~~be piped.~~include storm sewer.

D. Restoration of ditches with a flowline gradient between 1% and 3% requires topsoil and seed restoration; between 3% and 5% requires sod/staked or stabilized.

E. Side slopes of roadside ditches shall not be steeper than one foot of rise to three feet (3:1) of run.

F. Any ditches along an existing roadways or existing drainageways within development shall be regraded to conform to the specifications found in this section.~~)~~

G. For subdivisions with an urban typical section a sump pump collection system in accordance with Figure 10 is required.

3.7.2 Crossroad culverts

A. Minimum of 16" of cover as referenced from the centerline elevation of the finished road to the top of the pipe.

B. Size designated in the approved grading and drainage plan excepting that in all cases the minimum culvert size shall be 15" diameter.

C. Culvert endwalls, flared end sections or junction structures shall be required at all crossroad culverts or piped installations through or between home sites.

D. Riprap shall be required at outfalls where the flowline gradient exceeds 5% or 10 CFS.

3.7.3 All cul-de-sacs shall have a minimum 8 inch diameter storm sewer pipe with a 12 inch minimum catch basin installed to drain island to outside ditch or storm sewer system.(Location & materials determined by design engineer and approved by City of Mequon) See detail drawing Figure 3.

3.8 CONCRETE CURB AND GUTTER

3.8.1 Developments or subdivisions electing to use the standard residential cross-section with curb and gutter, shall use a mountable curb and gutter as detailed in Appendix A, Figure 6.

3.8.2 Cul-de-sacs or eyebrows shall have a landscaped island with a vertical face curb and gutter system as detailed in Figure ~~6~~3, Appendix A. This is to prevent damage to and facilitate drainage to the outer edge of pavement.

3.8.3 Concrete curb construction shall conform to Section 60, 710 and 716 of the latest edition of The State of Wisconsin Standard Specifications for Highway and Structure Construction.

3.8.4 Concrete curb and gutter shall be allowed to cure a minimum of seven days prior to backfilling and base course installation. After City acceptance, the contractor shall immediately backfill behind the curb to preclude any erosion or undermining.

3.8.5 The City requires three test cylinders properly marked for every 1,000 linear feet to be taken during the course of the curb and gutter operations.

A. The testing firm which has been hired by the developer, shall cast and pick up the cylinders at the project site, break the cylinders at the appropriate time as specified in the contract or in accordance with ASTM and submit a test report to the City.

B. If the cylinders break prior to the specified limit as specified in the contract or in accordance with ASTM, the corresponding section of curb and gutter shall be removed and replaced.

3.8.6 The City shall require an inspector for the placement of concrete curb and gutter. This shall include the inspection of the base under the curb and gutter, and a check of the alignment and grade of the curb and gutter.

3.9 CONCRETE SIDEWALK

3.9.1 Concrete sidewalk may be required in some circumstances and where required shall be constructed in accordance with Section 602, 710, and 716 of the State Specifications.

3.9.2 Concrete sidewalks shall be constructed 5 feet wide and 5 inches thick and to the line and grade shown on the plans unless otherwise directed by the City Engineer. Concrete sidewalks through driveways shall be 7 inches thick throughout the driveway opening. Sidewalk panels containing a detectable warning field shall be a minimum of 7" thick poured concrete.

3.9.3 One half inch (1/2") thick non-extruding expansion joint material extending the full depth of any adjacent concrete shall be installed as directed by the City Engineer. Expansion joints shall also be installed in a uniformly spaced manor with spacing not to exceed 75 feet. Expansion joint material shall also be installed at all locations where the sidewalk abuts a curb, building, utility structure, or any other structure.

3.9.4 All Sidewalk shall be constructed in accordance with current Americans with Disabilities Act (ADA) requirements.

Formatted: All caps

~~3.9.4~~3.9.5 Detectable warning fields to be cast iron. Warning fields to be black powder coated in the Town Center District and yellow powder coated or natural in the all other zoning districts.

3.10 HMA PAVEMENT BIKE & PEDESTRIAN PATH

3.10.1 HMA pavement bike and pedestrian paths shall conform to the Wisconsin Bicycle Facility Design Manual, current edition.

3.10.2 The subgrade for the full width of the path including the base shall be properly prepared in the same way as described for the roadway subgrade in Section 3.3. Any soft or spongy areas must be dug out and replaced with a suitable fill material.

3.10.3 The HMA pavement path shall be a minimum of 3 inches thick and shall be type LT~~E0.3~~, 9.5 mm.

3.10.4 All bike and pedestrian paths shall be constructed in accordance with current Americans with Disabilities Act (ADA) requirements. The cross section shall be as detailed in Figure 12, Appendix A, or as approved by the City Engineer.

3.11 PAVEMENT REPAIR

3.11.1 Pavement repair for utility installation in association with a Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way.

A. Installation Date

1. April 15 – November 15: The resulting asphalt section shall be comprised of HMA conforming to Section 3.11.1D on 3" of compacted Base Aggregate Dense ¾" on slurry backfill.
2. November 16 – April 14: Pavement shall be replaced with 8" concrete high early concrete designed for cold weather conditions in accordance with WisDOT Standard Specifications Section 415.3.13. Concrete shall be placed on slurry backfill.
3. If a concrete patch is installed in accordance with Section 3.11.1A.2 after April 15 but no later than June 15, the concrete shall be removed and replaced with asphalt. An additional right-of-way permit is required for the replacement of the pavement patch.

B. Pavement and curb and gutter shall be sawcut prior to removal. The areas of Pavement Repair shall be marked in the field for review and acceptance by the City. These areas shall be saw-cut prior to removing the pavement to provide a uniform joint to butt the new asphaltic concrete pavement repair material

C. The Contractor shall remove and dispose of all the old asphalt pavement, and as much of the granular base as necessary, to provide for an asphalt patch with the same thickness as the surrounding asphalt pavement, or a minimum of 4", whichever is greater

D. Materials

1. The Asphaltic Concrete Pavement used for Pavement Repair shall conform to the requirement of State Specifications, Section 450, 455, and 460.

~~v.~~ The type & grade of asphalt used shall be based on traffic volume as listed below:

2.

~~vi. E3~~ MT – Truck route or average daily traffic(ADT) of 3500 or more vehicles per day and

~~vii.~~i. ~~E1~~ Main collector road or arterial road with an ADT of less than 3500

~~viii.~~ii. ~~E0.3~~LT – Local residential streets

Formatted: Index 3, No bullets or numbering

Formatted: Indent: Left: 1.88", Numbered + Level: 2 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 2.5" + Indent at: 2.75"

Formatted: Indent: Left: 2", Numbered + Level: 3 + Numbering Style: i, ii, iii, … + Start at: 1 + Alignment: Right + Aligned at: 3.13" + Indent at: 3.25"

E. Grade – The grade of the asphalt shall be based on the layer and thickness being paved as listed below:

1. 19mm – Lower layers between 2.25 and 4.0 inches thick
2. 12.5mm – Lower layers between 1.75 and 2.25 inches thick or Upper layers over 2.0 inches thick
3. 9.5mm – Upper layers between 1.5 and 2.0 inches thick

F. Tack Coat - The Tack Coat material shall meet the requirements of the State Specifications, Section 455.3.2.

G. Construction

1. After these patch areas have been prepared and inspected by the City, the Contractor shall clean and apply a tack coat to the vertical faces of the existing pavement.
2. The patch areas shall be paved and compacted according to State Specifications, Section 450.
3. The finished patches shall be co-planer with the existing pavement.

H. Curb and gutter shall be replaced in kind with High Early 8 bag mix. Drill and install #6 Deformed 24" long tie bars into existing curb and gutter section.

I. Inspection

1. The City will require full time inspection of the pavement reparation.
2. The City requires inspection of the marked area of repair prior to saw-cutting and requires full time inspection of the base compaction and asphalt paving.
3. Provide the Engineering Division~~Department~~ minimum of 24 hour notice for the inspection of the marked area, and minimum of 3 working day notice for base compaction and paving inspection.

3.11.2 Pavement repair for failed pavement or pavement damage associated with a private construction project.

A. Pavement and curb and gutter shall be sawcut prior to removal. The areas of Pavement Repair shall be marked in the field for review and acceptance by the City. These areas shall be saw-cut prior to removing the pavement to provide a uniform joint to butt the new asphaltic concrete pavement repair material

B. Construction

1. Pavement and Base Removal – The Contractor shall remove and dispose of all the old asphalt pavement, and as much of the granular base as necessary, to provide for an asphalt patch with the same thickness as the surrounding asphalt pavement, or a minimum of 4", whichever is greater.
2. Compaction – After the existing pavement is removed and the lateral installed, the Contractor shall compact the existing base material using ordinary compaction methods. After these patch areas have been prepared and inspected by the City, the Contractor shall clean and apply a tack coat to the vertical faces of the existing pavement. The patch areas shall be paved and compacted according to State Specifications, Section 450. The finished patches shall be co-planer with the existing pavement.

C. Materials

1. The Asphaltic Concrete Pavement used for Pavement Repair shall conform to the requirement of State Specifications, Section 450, 455, and 460. The type & grade of asphalt used shall be based on traffic volume as listed below:

   ~~i. E3~~ MT– Truck route or average daily traffic(ADT) of 3500 or more vehicles per day

   ~~ii.~~i. ~~E1~~ and ~~M~~main collector road or arterial road with an ADT of less than 3500

   ~~iii.~~ii. ~~E0.3~~LT – Local residential streets

D. Grade – The aggregate gradation of the asphalt mixture shall be based on the layer and thickness being paved as listed below:

   1. 19mm – Lower layers between 2.25 and 4.0 inches thick
   2. 12.5mm – Lower layers between 1.75 and 2.25 inches thick or Upper layers over 2.0 inches thick
   3. 9.5mm – Upper layers between 1.5 and 2.0 inches thick

E. Tack Coat - The Tack Coat material shall meet the requirements of the State Specifications, Section 455.3.2.

F. Notification and Inspection

   1. The City requires inspection of the marked area of repair prior to saw-cutting and requires full time inspection of the base compaction and asphalt paving. Provide the Engineering Division~~Department~~ minimum of 24 hour notice for the inspection of the marked area, and minimum of 3 working day notice for base compaction and paving inspection.

3.12 SIGNAGE AND PAVEMENT MARKING

Formatted: Heading 3, Line spacing: single

3.12.1 All signs and posts shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), current edition.

Formatted: Font: Not Bold

3.12.2 Sign posts, foundations, and mountings shall be constructed to hold signs in a proper and permanent position.

3.12.3 Street signs shall be placed on a 2 3/8" galvanized post with a no-spin anchor. All other signs shall be placed on a 4x4 post, unless otherwise directed by the City Engineer.

3.12.4 Signs shall be sized as indicated on the following table, or as approved by the City Engineer.

Sign Type	Designation	Size (width x height)
Stop	R1-1	30" x 30"
Yield	R2-1	30" x 30"
Speed Limit	R2-1	24" x 30"

Formatted: Font: Bold

Formatted Table

Do Not Enter	R5-1	30” x 30”
No Right Turn	R3-1	24” x 24”
No Left Turn	R3-2	24” x 24”
No U Turn	R3-4	24” x 24”
End of Roadway Markers	OM4-1	18” per side
Street Sign	D3-1	9”

Formatted: Index 1

Formatted: Line spacing: single

3.12.5 Street name signs shall be an upper case letter followed by lower case letters or as directed by the City Engineer.

Formatted: Not Highlight

Formatted: Index 1

A. Upper case letters shall be 6-inches in height, or as directed by the City Engineer.

B. Lower case letters shall be 4.5 inches in height or as directed by the City Engineer.

3.12.6 Street signs shall be high intensity prismatic, green in color with white lettering. Letters should be reflective vinyl stick on style.

Formatted: Index 1

3.12.7 Street signs shall include the directional designation. The developer is responsible for coordinating the directional designation with the Engineering Division.

3.12.8 Shop drawings of all street signs are required.

3.12.9 Pavement markings for crosswalks and stop bar spacing shall conform to WisDOT Facilities Development Manual (FDM).

Formatted: Line spacing: single

Formatted: Font: 18 pt, Not Bold

CHAPTER 4

SANITARY SEWER

4.0 GENERAL

4.0.1 Work performed and materials supplied shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin (Standard Specifications) and the City of Mequon's Standard Specifications for Land Development. Any additional requirements of the Milwaukee Metropolitan Sewerage District (MMSD) and Wisconsin Department of Natural Resources (WDNR) shall also apply.

4.0.2 A full-time inspector shall be located at the job site during construction of the sanitary sewer and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)

4.0.3 All sanitary sewer plans are required to be reviewed by the City and then submitted to MMSD and WDNR for review and approval, as applicable. MMSD submittals require a conformance letter from the Southeastern Wisconsin Regional Planning Commission (SEWRPC).

4.0.4 Sanitary sewer calculations must be submitted with proposed sanitary sewer plans.

4.0.5 All sewers must be sized adequately to accommodate future tributary areas as directed by the City Engineer.

4.0.6 Open cutting the roadway is not permitted for sanitary sewer installation unless otherwise approved by the City Engineer.

~~4.0.5~~

~~4.0.6~~4.0.7 Public mains located within private property must be placed within an easement.

A. The City's standard width for sanitary sewer easements is 20 ft. for a single utility, plus 10 ft. for each additional utility within the easement. Reasonable access shall be provided.

B. No structures or trees will be permitted to be placed in utility easements. Unless avoidable: shrubs and plantings will be permitted in easement but not within a 5 foot radius of appurtenances. A landscaping plan and written explanation of why landscaping must be placed within easements needs to be submitted and addressed in the easement declaration agreement. Vehicular access must be provided to appurtenances.

C. Manholes shall be delineated with a post, as required by the Sanitary Sewer ~~Department~~Utility.

4.1 MATERIALS

4.1.1 Sanitary sewer pipe materials for mainline and laterals shall be limited to PVC, reinforced concrete, or HDPE.

4.1.2 All manholes shall be precast reinforced concrete and have a minimum inside diameter of 48 inches. Minimum wall thickness shall be per Table No. 1 in File No. 12 of the Standard Specifications. Precast concrete manhole base, barrel risers, cone section and adjusting rings shall meet the requirements of ASTM C-478. Manhole external seals shall be provided for each manhole and shall be manufactured by Infi-Shield or Adaptor, Inc. Manholes shall be constructed per drawing File No. 12 of the Standard Specifications and vacuum tested in accordance with Section 3.7.6 of the Standard Specifications.

4.1.3 Material used to backfill any portion of the sanitary sewer system in an existing roadway shall be aggregate slurry backfill conforming to Section 6.43.8 of the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin.

4.2 MANHOLES

4.2.1 All existing manholes shall be denoted with the City of Mequon manhole numbers from the Engineering Division.

~~4.2.1~~4.2.2 All manholes situated in cul-de-sacs shall be located within the roadway pavement.

~~4.2.2~~4.2.3 Manhole steps shall not be located in chimney section. ~~The first step shall be located 18" to 24" from the bottom of the frame.~~

~~4.2.3~~4.2.4 Manhole rim elevations shall be set to 1/8" below finished asphalt surface elevation.

~~4.2.4~~4.2.5 Manhole frames and covers supplied by the contractor shall be Neenah R-1661 with machine horizontal bearing surfaces. No pick holes or vent holes will be allowed in the cover.

~~4.2.5~~4.2.6 Chimney

A. A maximum of 2' and a minimum of 2" of chimney section shall be allowed, as measured from the manhole rim to the precast section of the manhole.

B. Manhole chimneys shall be constructed using high-density polyethylene (HDPE) riser rings. These should be installed per manufacturer's specifications with a butyl rope

sealant between each ring and between the top ring and the frame. Concrete riser rings may be substituted **with the approval of the City Engineer**. Concrete riser rings shall be installed using Penngrout mortar or approved equivalent. The mortar shall be placed between the cone section and the first riser ring, between each riser ring, and between the last riser ring and the manhole frame. This material shall be applied in a layer of at least ¼" thick.

~~4.2.6~~4.2.7 Seals

A. All manhole barrel joints shall have Mac Wrap or approved equivalent installed according to manufacturer's specifications.

B. All manholes shall be constructed with an Infi-shield or Adaptor Inc. external seal or approved equivalent extending from the frame to cone and shall be installed in the presence of a City inspector according to manufacturer's specifications.

~~4.2.7~~4.2.8 Construction

A. Manhole construction, complete with frame and cover, and backfilling shall be completed within three (3) working days after the sewer mainline is installed.

B. Manholes shall be inspected after all paving operations are complete. Any manhole frame or chimney section that has moved from its original position or has been damaged shall be reconstructed.

C. Manholes shall be vacuum tested in accordance with section 3.7.6 of the Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition.

4.3 MAINLINE

4.3.1 The Engineering Division~~Department~~ maintains record drawings for the public system. Please contact the Engineering Department for mainline and public lateral location information. ~~When starting a sewer project, the new incoming line into the existing manhole shall be plugged, or if constructing a new manhole over an existing line, the pipe shall not be broken out until the project is completed.~~

4.3.2 When starting a sewer project, the new incoming line into the existing manhole shall be plugged, or if constructing a new manhole over an existing line, the pipe shall not be broken out until the project is completed.

4.3.3 Material used to backfill sanitary sewer trenches located in a proposed roadway shall conform to Crushed Road Gravel Table 39 Sec. 8.43.7 as specified in the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin.

4.3.4 Trenches located in a roadway shall be compacted to 95% of standard proctor maximum dry density. The first lift of backfill over the pipe shall be 18" thick with subsequent lifts being no more than 12" in thickness.

4.3.5 The flushing of trenches will not be permitted after September 1 if the roadway is to be completed prior to November 15. No flooding of trenches located in an off roadway area, that have spoil backfill, will be permitted. The use of frozen spoil materials for trench backfill, will not be permitted under any conditions.

4.3.6 The trench shall be kept free of visible water during any backfilling or compaction work.

4.3.7 Sand will not be allowed as bedding material for sanitary sewer.

4.3.8 Existing manholes that do not have an opening for the new sanitary sewer shall have an opening cored from the inside in the existing manhole to accommodate the new sanitary sewer.

4.3.9 Trench consolidation achieved by flushing will require a 10 day waiting period before deflection testing may be performed.

4.3.10 Manholes shall be placed at intervals of 400' or less, unless otherwise approved by the City Engineer.

4.3.11 Sewer depth shall be designed to accommodate gravity flow from the lowest part of all buildings. Residential basements shall have an assumed minimum depth of 10 ~~ft~~ft. from finished floor elevation to the basement floor elevation. Also, 1.8 ft. should be used for the depth from the basement floor to the sewer lateral to accommodate for clearing the footing depth.

4.3.12 Mainline sewer shall be designed to provide a minimum velocity of 2 ~~ft~~ft./sec at 50 % full with a minimum slope:

A. 0.0045 ft./ft. for 8" PVC

B. 0.0033ft./ft. for 10" PVC

C. 0.0027 ft./ft. for 12" PVC.

4.3.13 Detectable marking tape shall be placed directly over and along the entire length of sewer main located in off road easement areas. Tape shall be placed 6" below finished grade, be 3" in width and specify buried sewer line. Magnetic markers shall also be placed directly over all bends. These markers shall consist of a Bernsten 2½" Flat Top Aluminum Survey Cap (#400407FTX-6-250) placed on top of a 30" long ¾" rebar. The top of the Survey Cap shall be 12" below finished grade.

4.3.14 All force main bends shall be restrained with mega lugs and either hard wood thrust blocking or concrete buttress.

4.3.15 Inside drops over 2' will be allowed with the use of a dropbowl and stainless steel mounting brackets. Discharge shall be at flowline of manhole without obstructing the line.

4.4 LATERALS

4.4.1 It is the responsibility of the property owner to confirm the location and condition of the existing public lateral. In some locations, televising may be the only feasible means to determine the location and condition of the existing public lateral. Televising costs are the responsibility of the property owner.

4.4.2 Existing public laterals must be lined with a LMK T-liner or approved equivalent prior to connection. Exceptions will only be considered if the existing public lateral is PVC and the Engineering Division~~Department~~ approves the condition as satisfactory. Televising and witnessing is required to determine the existing condition.

4.4.3 All laterals shall follow the locating requirements of the Wisconsin Administrative Code ~~(s. 182.0715(2r)).~~ SPS382.30 11(h). ~~When required,~~For private interceptor sewers,

Formatted: Not Highlight

Formatted: Font color: Text 1, Not Highlight

Formatted: Font color: Text 1

Formatted: Font color: Text 1, Not Highlight

Formatted: Not Highlight

pipes~~laterals~~ shall have a tracer wire attached, from the mainline to the property line. The tracer wire shall be daylighted at the property line using a VALVCO cathodic protection test station model No. 253TM301800.1PT.

4.4.4 Laterals shall be 6" in diameter and installed at a quarter inch per foot (2%) gradient. A mapleheart shall be installed at the end of all laterals, and the top 12" shall be painted orange upon completion of the lateral installation. All laterals shall end 1.0' beyond property line. All laterals with less than 6.0' of cover material, shall be insulated with 2' X 8' X 2" thick planks of styrofoam plastic foam (Dow Chemical Company "Hybrand" or approved equivalent).

~~4.4.5 Open cutting the roadway is not permitted for sanitary sewer lateral installation.~~

~~4.4.6~~4.4.5 If open cutting the roadway is required, a Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way application must be filed with the Engineering Division ~~Department~~ for work within the right-of-way.

A. Lateral trench shall be backfilled with No. 2 slurry mix in accordance with the Standard Specifications.

B. The Contractor must contact the Engineering Division~~Department~~ a minimum of 3 days prior to lateral work and inspection will be required.

C. A pavement patch must be installed over the utility trench in accordance with Section 3.11 of the City of Mequon Standard Specifications for Land Development.

D. In addition to the Permit to Construct, Maintain or Repair Utilities within Highway Right-of-Way form, the following must be submitted to the Engineering Division~~Department~~ prior to construction:

1. Schedule of construction, including any requirements for lane closures.
2. Road bond, escrow or letter of credit. Please contact the Engineering Division~~Department~~ for amount requirements.
3. Traffic control plan in accordance with the MUTCD.
4. Proof of notification to all affected businesses a minimum of 3 days prior to the proposed open cut.

E. Modifications to this policy require written approval from the Engineering Division ~~Department~~ prior to implementation.

4.5 LATERAL ABANDONMENT

4.5.1 All sewer lateral abandonments shall occur in the public right of way. Public laterals shall be televised by the property owner prior to abandonment and witnessed by the City Engineering Department.

A. If the Engineering Division~~Department~~ determines that the public lateral is suitable for future connection, the property owner is responsible for cutting the lateral and installing a cleanout at the property line. The Contractor shall provide lateral location information to the Engineering Department to update its record drawings.

B. If the Engineering Division~~Department~~ determines that the public lateral is not suitable for future connection, the property owner is responsible for following the terms of the lateral abandonment permit:

1. If a riser is installed, a patch must be installed at the lateral connection at the mainline consisting of a cure in place material at the size of the existing main.
2. The public lateral shall be grouted and abandoned in place.
3. The Contractor shall provide lateral location information to the Engineering Division~~Department~~ to update its record drawings.

C. Modifications to this policy require written approval from the Engineering Division~~Department~~ prior to implementation.

4.6 TESTING

4.6.1 Prior to acceptance, the City of Mequon will perform closed circuit television inspection of all sanitary sewer mains installed. The contractor shall be required to repair all visible damage and leaks in the sanitary sewer mains. This procedure is in addition to any testing required by the Standard Specifications for Sewer and Water Construction in Wisconsin and/or MMSD.

4.6.2 All costs associated with televising will be the responsibility of the developer.

CHAPTER 5

WATER DISTRIBUTION SYSTEM

5.0 GENERAL

5.0.1 A Water Services Agreement is required for the extension of public water-main.

5.0.2 Work performed and materials supplied shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction in Wisconsin (Standard Specifications), and the City of Mequon's Standard Specifications for Land Development.

5.0.3 A full-time inspector shall be located at the job site during construction of the watermain and laterals. The contractor responsible for the construction of the sanitary sewers and laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)

5.0.4 All water-main plans are required to be reviewed by the City.

5.0.5 All water-main shall be a minimum of 8" in diameter.

5.0.6 Open cutting the roadway is not permitted for watermain installation unless otherwise approved by the City Engineer.

~~5.0.5~~

Formatted: Normal

5.1 PIPE MATERIALS

5.1.1 Polyvinyl Chloride (PVC) Pipe

A. Polyvinyl chloride (PVC) pipe must conform to AWWA C900 and C905 specifications with a class of DR-18. Pipe shall have push-on joints with flexible elastomeric ring gasket in accordance with AWWA D-1869.

B. PVC pipe shall meet the requirements of Chapter 8.20.0 of Standard Specifications.

C. PVC pipe shall be blue in color.

5.1.2 High Density Polyethylene (HDPE) Pipe

A. Where specified by construction plans or Design Engineer, HDPE pipe shall be used.

B. HDPE ~~water main~~watermain pipe shall conform to AWWA C-906 standards and shall have 3 equally spaced blue stripes or a solid blue color coded exterior surface.

C. All HDPE ~~water main~~watermain pipe shall be Ductile Iron Pipe Size (DIPS) and shall have a DR-11 for sizes 4 inch through 6 inch and a DR-13.5 for sizes 8 inch and larger.

D. Materials used for the manufacture of high density polyethylene pipe and fittings shall comply with all requirements ASTM D3350 and have a PPI recommended designation of PE4710. The molecular weight category shall be extra high (250,000 to 1,500,000) as per the Gel Permeation Chromatography determination procedure with a typical value of 330,000.

~~D.~~

Formatted: Normal

5.1.3 Ductile Iron (DI) Pipe

A. Where specified by construction plans or Design Engineer, DI pipe shall be used.

B. Unless otherwise specified, all DI pipe shall be Class 52 conforming to AWWA C-515, ANSI A21.51, and Chapter 8.18.0 of Standard Specifications.

C. All DI pipe shall be encased with a polyethylene film in accordance with Chapter 4.4.4 and Chapter 8.21.0 of Standard Specifications.

5.2 TRACER WIRE

5.2.1 Contractor to install insulated #10 gauge solid copper wire along PVC and HDPE pipe installations. Tracer wire shall conform to Chapter 2.11.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition. Open trench installations the wire should be laid along the main, attached with tape at 30 ft. intervals.

5.2.2 Test tracer wire test connections can be made at stop boxes located back from the curb, at control point boxes where the wire is looped up from the line to the surface grade, or at service risers attached with a cable tie.

5.2.3 The wires can be spliced together using a corrosion proof wire connector.

5.3 BEDDING, COVER, & BACKFILL

5.3.1 Pipe Bedding, cover, and backfill materials shall conform to Chapter 8.43.0 of Standard Specifications; however, sand may typically be approved as an alternate for HDPE pipe bedding.

5.3.2 Bedding

A. All materials used for bedding, shall conform to Chapter 4.3.3 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition. Primary and secondary backfill should be installed to at least 90 percent Standard Proctor Density, or as specified by the Engineer.

B. Bedding material shall consist of 3/8" Crushed Chips meeting the requirements of Chapter 8.43.2 of Standard Specifications.

C. Sand bedding material shall meet the requirements of Chapter 8.43.2 (c) of Standard Specifications

D. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent pipe movement during backfilling operations.

5.3.3 Backfill

A. Backfill requirements shall conform to Chapter 2.6.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

B. All materials used for bedding, shall conform to Chapter 4.3.3 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition. Primary and secondary backfill should be installed to at least 90 percent Standard Proctor Density, or as specified by the Engineer.

C. Backfill requirements shall conform to Chapter 2.6.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

D. Graded Aggregate backfill material shall meet the requirements of Chapter 8.43.7 of Standard Specifications.

E. Spoil backfill shall meet the requirements of Chapter 8.43.5 of Standard Specifications. Suitable material shall be free of rubbish, trees, stumps, branches, frozen material, concrete or bituminous chunks. Spoil backfill can be used outside of pavement locations and ~~where as~~whereas designated on the plans by the Engineer.

F. Backfill within Pipe Zone

1. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent pipe movement during backfilling operations.
2. Place material completely under pipe haunches and hand tamp along the pipe haunches with a shovel.

G. Backfill above Pipe Zone

1. Aggregate Slurry Backfill shall be used above the pipe zone under pavement. Slurry shall meet the requirements of Chapter 8.43.8 of Standard Specifications. Aggregate slurry shall consist of No.1 and No.2 coarse aggregate, and Class C concrete mix with cement deleted.
2. Granular backfill material shall be used above the pipe zone under driveways, and sidewalks or as noted on the plans. Granular backfill material shall meet the requirements of Chapter 8.43.4 of Standard Specifications.
3. Place in uniform depths. Initial layer shall be 24 inches and subsequent layers shall not exceed 18 inches before compaction. Complete compaction of each layer before placing material for the succeeding layer.
4. Compact each layer by mechanical means until it meets the requirements of Chapter 2.6.14 (b) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
5. Any deficiency in quality and quantity of backfill material (caused by shrinkage of settlement) shall be supplied at no additional cost to the City.

5.4 ~~WATER MAIN~~WATERMAIN TRENCH

5.4.1 Trench width shall be in accordance with Chapter 4.2.1 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.4.2 Trench bottom must be construction to line and grade as specified by the Engineer. Contractor must conform to Chapters 4.3.2 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition when preparing trench.

5.5 DEWATERING

5.5.1 Dewater the ground as necessary to excavate the trench and install the ~~water main~~watermain. All pipe and appurtenances shall be laid in a dry condition prior to backfilling. Maintain groundwater level a minimum of 12 inches below pipe invert.

5.5.2 Measure the flow rate from the dewatering pumps at the beginning of the dewatering operation(s) and once a week thereafter. Keep a daily log of hours pumped.

Formatted: Indent: Left: 1", No bullets or numbering

5.5.3 A dewatering permit is required for all dewatering wells installed or operated for a single or aggregate pumping rate would exceed 70 gallons per minute (gpm). Contractor can obtain a permit from:

Formatted: Indent: Left: 2"

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
PRIVATE WATER SUPPLY SECTION
P.O. BOX 7921
MADISON, WI 53707

5.6 DUCTILE IRON ~~WATER MAIN~~WATERMAIN FITTINGS

5.6.1 All ~~water main~~watermain fittings shall conform to AWWA C-110, C-153 DI compact fittings and Chapter 8.22 of Standard Specifications.

5.6.2 Ductile iron compact fittings shall be rated at 350 psi.

5.6.3 All fitting shall be mechanical joint, unless otherwise specified.

5.6.4 Mechanical joints shall be made with "CorBLUE" nuts and bolts, or approved corrosion resistant equivalents which conform to AWWA C-111.

5.6.5 All mechanical joints shall be restrained with EBBA Iron "Megalug" restraint devices for the particular type of pipe (PVC, HDPE, DI) or equal.

5.6.6 Restraining distances for all mechanical joints shall be determined by the design engineer in accordance with Chapter File 47A of Standard Specifications. Restraint harness shall be EBBA Iron series 2800 or approved equal.

5.6.7 All fittings shall be encased with two wraps of polyethylene film in accordance with Chapter 4.4.4 and Chapter 8.21.0 of Standard Specifications.

5.7 HDPE ~~WATER MAIN~~WATERMAIN FITTINGS

5.7.1 Mechanical joint (MJ) adapters shall be used for joining HDPE ~~water main~~watermain to a fitting, or valve to prevent pipe pull out. MJ adapters shall be restrained with EBBA Iron " Megalug" restraint devices for HDPE pipe.

5.7.2 All fabricated HDPE fitting must be individually approved by the engineer.

5.7.3 Electrofusion couplings shall be Friatec electrofusion couplings. Electrofusion couplings will only be allowed if approved by the Utility Engineer.

5.7.4 Stiffeners for pipe 4 inch and larger shall be Cascade brand drive-in stiffeners or approved equal.

5.8 ~~WATER MAIN~~WATERMAIN FITTING INSTALLATION

5.8.1 ~~Water main~~Watermain fittings shall conform to Chapter 4.7.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.8.2 Install ~~water main~~watermain fittings in accordance with AWWA C600

5.8.3 Double wrap all ~~water main~~watermain fittings according to Chapter 4.4.4, Polyethylene Wrap, (8 mil and taped securely to pipe) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.9 THRUST RESTRAINTS

5.9.1 Megalugs (Mechanical Joints)

A. Megalugs shall be used at all bends, tees, reducers, and dead ends to restrain the required lengths of pipe against potential thrust forces in the pipeline.

B. Retaining gland restraints shall be used in lieu of concrete block buttresses. Restraining distances for all mechanical joints shall be determined by the design engineer in accordance with suppliers recommendations and Chapter File 47A of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.9.2 Concrete Buttresses / Thrust Blocks

A. Use of concrete buttresses shall be determined by the design engineer. Thrust blocks shall conform to File numbers 44, 44A, 45,46, and 47 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition and AWWA C-600-99.

B. Concrete thrust blocks shall be used to anchor HDPE water that has been directionally drilled. Thrust blocks shall be designed by the design engineer, and installed according to manufacturer's recommendations.

5.10 TAPPING SLEEVE

5.10.1 All live taps shall be done with stainless steel tapping sleeves and mechanical joint flanged tapping valves.

5.10.2 Tapping sleeves shall be Smith-Blair series 663 or approved equal. Tapping sleeves shall have a stainless steel test plug. No dissimilar metals will be allowed.

5.10.3 The outside diameter of the pipe being tapped, the size of the outlet pipe (branch or tap service line), and the working pressure should be specified to assure that the sleeve will be satisfactory.

5.10.4 Tapping sleeves shall not be placed closer than 4 ft. from the bell end of the pipe, fittings, or additional taps.

5.10.5 Tapping sleeves should be assembled and installed according to the instructions provided by the manufacturer.

5.10.6 Tapping sleeves for DI or PVC shall be all stainless steel, including a stainless steel test plug. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles.

5.11 ~~WATER MAIN~~WATERMAIN VALVES

5.11.1 Watermain Valve Location and Requirements

A. Each tee shall have two valves located 5 feet from the tee in the apparent downstream directions. The apparent downstream directions are the opposite of the high pressure or apparent normal source direction.

B. Each cross shall have three valves located 5 feet from the cross in the apparent downstream directions.

C. Unless otherwise approved valves shall be located 5 feet from hydrant tees or ~~water main~~watermain intersections. Valves may be moved a short distance to be place outside of pavement.

5.11.2 Valves 4" to 12"

A. Shall be resilient wedge seal (R/W), open to the left, conforming to the requirements of AWWA C-509, C-515 not allowed. Valves shall be Mueller Model A-2360 or approved equal.

B. Valves shall have mechanical joints conforming to AWWA C-111 on both ends, except for tapping valves.

C. Valves shall meet the requirements of Chapter 8.27.0 of Standard Specifications.

5.11.3 Valves 14" and Larger

A. Shall be butterfly valves conforming to AWWA C-504 for Class 150B.

B. Valves shall have mechanical joints conforming to AWWA C-111 on both ends.

C. Valves shall have a Buna N Rubber seat that is bubble tight and a ductile iron disk with stainless steel seating surface. 304, 18-8 Stainless steel shafts with stainless steel disc pins.

D. Operator shall be worm gear type for underground service, Limitorque 90° Worm Gear or equal.

E. Butterfly valves shall meet the requirements of Chapter 8.28.0 of Standard Specifications.

5.11.4 Valve Boxes

A. Valve Boxes shall be 5¼ inch diameter, three piece screw type box with a number six base. Covers shall be marked "WATER" and shall be Stay Put type, Clow series F-2494 or approved equal and meet the requirements of Chapter 8.29.0 of Standard Specifications

B. All valve boxes shall be installed with a pre-manufactured valve box support designed for the size and type of valve and valve box.

5.11.5 Installation

A. All ~~water main~~watermain valves shall meet the requirements of Chapter 4.8.0 “Standard Specification for Sewer & Water Construction in Wisconsin” latest edition.

B. Gate and Resilient Wedge Valves

1. Gate and resilient wedge valves shall conform to AWWA C-500 for gate valves and C-509 for resilient wedge valves.
2. Valve shall be suitable for direct burial type installation on distribution mains.
3. Valves shall be supported on an 8-inch concrete block.
4. Install valve box adapter prior to setting the valve box.

5. Wrap valves according to Chapter 4.4.4, Polyethylene Wrap, (8 mils) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition

C. Butterfly Valves

1. Butterfly valves shall conform to AWWA C-504.
2. Butterfly valves shall be supported on an 8-inch concrete block
3. Wrap valves according to Chapter 4.4.4, Polyethylene Wrap, (8 mils) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition

D. Valve Box

1. Maintain valve box centered and plumb over the operating nut of the valve.
2. Approved bedding materials shall be tamped in place from a point above the main to a point 6-inches above the bottom of the valve box base to prevent the valve box from shifting.
3. Set top of valve box flush with the existing surface to provide 12-inches of upward adjustment.
4. Wrap gate valves according to Chapter 4.4.4, Polyethylene Wrap (8 mils) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.12 FIRE HYDRANTS

5.12.1 Fire Hydrants shall conform to AWWA C-502 for Dry Barrel Fire Hydrants

5.12.2 Fire Hydrants shall meet the requirements of Chapter 8.26.0 of Standard Specifications.

5.12.3 Material/Manufacturer Specifications

A. Fire hydrants shall be Waterous, ~~Clow,~~ or Mueller Centurion break flange type.

B. Hydrant tees shall be Clow F012117 mechanical joint anchoring tees or approved equal.

C. Hydrant Leads shall be 6-inch DI (class 52) pipe, meeting the requirements of AWWA C-900..

D. Hydrant Branch piping material meeting the requirements of Chapter 4.6.3 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

E. Crushed stone as specified in Chapter 8.43.6 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition, shall be placed below the base to at least 6-inches above the drain hole in the hydrant stem.

5.12.4 Operational Specifications

A. Hydrants shall have one 4½ inch and two 2½ inch nozzles.

B. Hydrants shall open counter clockwise and be painted bright red.

5.12.5 Hydrant Locations and Requirements

A. The designed location of hydrants must take into account regulations, serviceability, cost, and the following guidelines.

B. Hydrant spacing shall conform to the following table:

Zoning	Maximum Hydrant Spacing
Commercial	300'
Residential	500'

C. Hydrants in locations with curb shall be placed 2½ feet behind the back of curb.

D. Hydrants in location without curb shall be placed 2 feet from the right-of-way.

E. Hydrants shall be a minimum of 30 feet from any building wall.

F. The centerline of the hydrant's 4½ inch nozzle shall be 18 to 24 inches above the center of pavement.

G. Hydrant lengths shall be sized for the specific installation. No hydrant extensions will be allowed without prior approval. Hydrant nozzles shall be 18 inches to 21 inches above the center of paved roadway.

5.12.6 Installation Requirements

A. Hydrants shall conform to Chapter 4.8.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

B. Each hydrant shall be installed with a spring mounted hydrant marker that is bolted to the top of the hydrant~~, orange in color, and made of fiberglass~~.

C. After each hydrant has been set, place around the base of the hydrant 1-inch clean washed stone, 3-feet in diameter around the hydrant and 1-foot above the drain holes. Filter fabric shall be placed above the washed stone

D. Hydrants shall be solidly buttressed against the trench wall with the use of hardwood blocking.

E. Hydrants shall be set on 8" concrete block and the centerline of the hydrant, when set, shall be vertical.

F. Wrap hydrant assembly according to Chapter 4.4.4, Polyethylene Wrap, (8 mil and taped securely to pipe) of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition, to the bottom of the breakaway flange.

5.13 WATER SERVICE LATERAL

5.13.1 Water services

A. Service laterals shall be HDPE, PE 4710, SDR 9 (pressure rating 200 psi) pipe meeting the requirements of AWWA C-901 unless otherwise specified on plan or directed by the engineer.

B. Residential service laterals shall be 2"in diameter. The City of Mequon reserves the right to approve a smaller diameter water lateral if project engineer submits design calculations showing a smaller diameter water service will meet the requirements of PSC 185.82 and the Department of Commerce (Comm82.40).

C. Tapping saddles shall be stainless steel and used for all service taps. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles. ~~or if mechanical shall be installed with a minimum of 3 Bellville spring washers per bolt.~~

D. Corporation stops shall be Mueller B-25008, or approved equal and meet the requirements of Chapter 8.30.0 of Standard Specifications.

E. Curb stops shall be Mueller B-25155, or approved equal and shall meet the requirements of Chapter 8.31.0 of Standard Specifications.

F. Curb boxes shall be -Ford Minneapolis Pattern base ~~cast iron Mueller H-10300 with curb stop key extension~~, or approved equal and meet the requirements of Chapter 8.25.0 of Standard Specifications

G. Pipe stiffeners must be used at all mechanical connections over 1".

5.13.2 Water services 4 inch and larger

A. Curb stops for 4 inch and larger services shall conform to the ~~water main~~watermain valve specification.

B. Unless otherwise approved, the service tee shall be an anchor tee.

C. Tapping sleeves for DI or PVC shall be all stainless steel, including a stainless steel test plug. Tapping saddles on HDPE pipe shall be heat or electrofusion branch saddles or if mechanical shall be installed with a minimum of 3 Bellville spring washers per bolt.

5.13.3 Ductile Iron Main

A. General

1. All pipe services and connections are made in accordance with Chapter 5.5.0 of the Standard Specifications for Sewer & Water Construction in Wisconsin and AWWA C600-93.
2. Water service connections are designated as either direct tapping, saddle tapping, or tapping sleeve and valves. Water service piping is designated as either tap service or branch service.

Maximum Recommended Direct Tap Size for 3 through 24 inch Ductile Iron Pipe

Size	**Pressure Class**				
(inches)	**150**	**200**	**250**	**300**	**350**
3					¾
4					¾
6					1
8					1
10					1
12					1 ¼
14			1 ¼	1 ½	1 ½
16			1 ½	2	2
18			2	2	2
20			2	2	2
24		2	2	2	2

B. Direct taps may be used on all pressure classes and size ductile iron pipes:

1. Corporation stops shall be threaded and conform to ANSI/AWWA C800-89.
2. Direct taps shall not be closer than 12 inches from the ends of the pipe, or fittings. Multiple taps in a single pipe shall be staggered around the

circumference and at least 12 inches apart when measured along a straight line.

3. The following procedure may be followed when installing a direct tap on a polyethylene encased pipe:

   ~~iv.~~iii. Wrap two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted.

   ~~v.~~iv. The tapping machine shall be placed firmly on the pipe in accordance with recommendations of the machine manufacturer. Corporation stop installation should be done according to the manufacturer's instructions for the tapping device.

   ~~vi.~~v. Acceptable sealant tape may be applied to the threads of the corporation stop to prevent leakage at lower pressures and to reduce installation torque requirements.

   ~~vii.~~vi. If leakage at the threads occurs the connection should be tightened. If leakage persists the line shall be depressurized and the corporation stop reinstalled after the pipe hole threads have been cleaned.

C. Saddle Tapping for ductile iron pipe requires that the following conditions are met:

1. Saddle tapping may be used on all class and size pipes; however, the outlet line must be a maximum 2 inch diameter. (Tap service line).
2. Saddle sleeve edges shall not be placed closer than 12 inches from the bell end of the pipe, fittings, or additional taps.
3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
5. Water service piping shall have a minimum cover of 6 ft. from the established street grade. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of 6 ft. and a maximum cover of 6½ ft. from the established street grade.
6. The following procedure should be followed when installing a saddle tap:

   i. The service clamp or saddle shall be evenly tightened on the pipe. The inlet side of the corporation stop shall be screwed into the saddle threads and the stop valve shall then be opened.
   ii. The drilling machine shall be attached to the ~~corportation~~corporation stop's outlet threads.
   iii. After the hole has been cut, the cutter shall then be withdrawn, the corporation stop closed, and the drilling machine removed from the pipe. If leakage occurs, the corp stop should be tightened.

D. Tap Service Piping

1. Tap service piping shall include all pipe 2 inches in diameter or smaller.
2. The components of a tap service are the: service tee or corporation stop, pipe, curb stop with a peened end tail piece that extends beyond the curb stop to the lot line, and service box.
3. The standard water service shall have a minimum internal diameter that is in accordance with the Wisconsin Administration Code, and with the curb stop located as specified by the Engineer.

4. Pipe from the service tee to curb stop shall be of one continuous length unless fittings are specified by the Engineer.

E. Branch Service Piping

1. Branch service piping shall include all water piping 3 inches in diameter or larger.
2. The components of a branch service are: a tapping sleeve and valve or a 3-way branch, a valve, a valve box and extension of pipe extending to the lot line at which point the end will be plugged or capped.

F. Service Connection to ~~Water Main~~Watermain

1. The minimum distance between a corporation stop and any mechanical fitting is a distance of 1 foot.
2. The minimum distance from any fitting, or another tap on either side of the main to a tapping valve is a distance of 4 feet.

G. Alignment, Position, and Grade

1. The minimum vertical clearance between the water service and a building sanitary sewer shall be 12 inches if the water service is above, and 18 inches if the water service is below.
2. Water service piping crossing above or below conduits or other structures shall have a minimum clearance of 3 inches.
3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
5. Water service piping shall have a minimum cover of 6 ft. from the established street grade. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of 6 ft. and a maximum cover of 6½ ft. from the established street grade.

5.13.4 PVC MAIN

A. General Requirements

1. All pipe services and connections are made in accordance with Chapter 5.5.0 of the Standard Specifications for Sewer & Water Construction in Wisconsin and AWWA C605-94.
2. Water service connections are designated as either direct tapping, saddle tapping, or tapping sleeve and valves. Water service piping is designated as either tap service or branch service.

~~B. Direct Tapping services on PVC main requires that the following conditions are met:~~

~~1. Taps shall be 1 inch or smaller. (Tap service line).~~

~~2. Nominal pipe sizes shall be limited to 6 inches through 12 inches.~~

~~3. Corporation stops shall be threaded and conform to ANSI/AWWA C800~~

Formatted: Index 2

~~4. Direct taps shall not be made closer than 24 inches from pipe ends, or fittings. Multiple taps in a single pipe shall be staggered around the circumference and at least 18 inches apart when measured along the axis of the pipe.~~

~~5. The following procedure should be followed when installing a direct tap:~~

~~i. All tapping should be done in accordance with instructions of the machine manufacturer.~~

Formatted: Index 2, No bullets or numbering

~~ii. Two spiral wraps of three-mail PTFE tape shall be applied clockwise to the inlet threads on the closed corporation stop.~~

~~iii. The insertion shall be completed using torque wrench and tightening to 27 ft-lbs.~~

~~iv. At correct insertion the corporation stop should have one to three threads visible. If leakage occurs a torque wrench can be used to tighten the stop to 35 ft-lbs.~~

~~v. If leakage persists the line shall be depressurized and the corporation stop reinstalled after the pipe hole threads have been cleaned.~~

~~C.~~B. Saddle Tapping: Saddle tapping requires that the following conditions are met:

1. Saddle tapping may be used on all class and size pipes; however, the outlet line must be a maximum 2 inch diameter. (Tap service line).
2. All service clamps or saddles used on PVC shall be manufactured specifically for PVC. The clamp bearing area shall be a minimum 2 inch width for taps up to 1 inch, and a minimum 3 inch width for taps 1¼ inches to 2 inches.
3. Saddle sleeves shall not be placed closer than 1 ft. from the bell end of the pipe, fittings, or additional taps
4. The following procedure should be followed when installing a saddle tap:

   i. The service clamp or saddle shall be evenly tightened on the pipe. The inlet side of the main stop or corporation stop shall be screwed into the saddle threads. The main-stop valve shall then be opened.
   ii. All tapping should be done in accordance with instructions of the machine manufacturer.
   iii. After the hole has been cut, the cutter shall then be withdrawn, the corp stop closed, and the drilling machine removed from the pipe. If leakage occurs, the corp stop should be tightened.

~~D.~~C. Tapping Sleeves and Valves Tapping sleeves and valves are required for connections other than those described in Section 350.2 and 350.3.

1. The outside diameter of the pipe being tapped, the size of the outlet pipe (branch or tap service line), and the working pressure should be specified to assure that the sleeve will be satisfactory.
2. Tapping sleeves shall not be placed closer than 4 ft. from the bell end of the pipe, fittings, or additional taps.
3. Tapping sleeves should be well supported, independent of the pipe during tapping The support used should be left in place.
4. Tapping sleeves should be assembled and installed according to the instructions provided by the manufacturer.

~~E.~~D. Tap Service Piping

1. Tap service piping shall include all pipe 2 inches in diameter or smaller.

2. The components of a tap service are the: service tee or corporation stop, pipe, curb stop with a peened end tail piece that extends beyond the curb stop to the lot line, and service box.
3. The standard water service shall have a minimum internal diameter that is in accordance with the Wisconsin Administration Code, and with the curb stop located as specified by the Engineer.
4. Pipe from the service tee to curb stop shall be of one continuous length unless fittings are specified by the Engineer.

~~F.~~E. Branch Service Piping

1. Branch service piping shall include all water piping 3 inches in diameter or larger.
2. The components of a branch service are: a tapping sleeve and valve or a 3-way branch, a valve, a valve box and extension of pipe extending to the lot line at which point the end will be plugged or capped.

~~G.~~F. Service Connection to ~~Water Main~~Watermain

1. The minimum distance between a saddled corporation stop and a mechanical fitting is a distance of 1 foot. (Does not apply to a direct tap.)
2. The minimum distance from any fitting, or another tap on either side of the main to a tapping valve is a distance of 4 feet.

~~H.~~G. Alignment, Position, and Grade

1. The minimum vertical clearance between the water service and a building sanitary sewer shall be 12 inches if the water service is above, and 18 inches if the water service is below.
2. Water service piping crossing above or below conduits or other structures shall have a minimum clearance of 3 inches.
3. Tap service lines shall have a minimum horizontal separation of 18 inches from a parallel building sewer line.
4. Branch service lines shall have a minimum horizontal separation of 24 inches from a parallel building sewer line.
5. Water service piping shall have a minimum cover of 6 ft. from the established street grade. The curb stop of the tap water service or the gate valve of the branch service shall have a minimum cover of 6 ft. and a maximum cover of 6½ ft. from the established street grade.

5.13.5 Setting Water Service Box

A. Water service box shall be centered over the curb stop and shall be brought to proper grade.

~~B. The legs of the service box shall rest firmly upon a 2-inch by 6-inch by 8-inch hardwood board~~

~~C. Clearance shall be provided so the service box does not rest upon the water service valve~~

~~D.~~B. Where the bench does not affect a firm support for the service box blocking, such support shall be furnished by the use of a 2-inch by 6-inch plank placed across the building sanitary sewer trench and firmly supported in each bank.

~~E.~~C. The service box shall be plumbed and braced so it will remain vertical throughout the backfilling.

~~F.~~D. Sufficient excavation shall be made for the service box installation to insure proper setting and backfilling around the service box

5.14 CASING PIPE

5.14.1 Steel casing pipe wall thickness shall meet the requirements of File No. 49 of Standard Specifications and conform to the following:

A. All pipe shall conform to all applicable requirements of AWWA C200-86 and AWWA M11, and if fabricated shall be constructed of A36 steel with a minimum yield point of 36 ksi; or if manufactured shall conform to Grade B with a minimum yield point of 35 ksi.

B. Steel casing pipe wall thickness shall conform to the following schedule:

CASING DIAMETER MINIMUM WALL THICKNESS Casing Diameter (in.)	Casing Thickness (in.)
6 – 12	0.188
14 – 18	0.250
20 – 30	0.3125
32 – 48	0.4375

C. All casing pipe to be joined with 360 degree welds. It shall be mill primed and coated with bituminous based coating before installation. Where coating is damaged during installation, it shall be repaired and replaced by thorough brushing or scraping to sound material and applying two coats of the coating material.

D. It may be shipped in random lengths between 18 and 22 feet and shall have one end cut square and one end beveled.

E. ~~Water main~~Watermain installed in a casing pipe shall be restrained, wood blocking is not allowed.

F. Casing Spacers: The casing spacers shall have a bolt on shell made in two sections. All metal components shall be Type 304 (18-8) Stainless Steel. It shall have an elastomeric liner to isolate the shell from the carrier pipe. It shall have runners attached to the shell and be designed to provide a minimum of .75 inches clearance between the carrier pipe's greatest outside diameter and the casing pipe's inside diameter. The chock runners shall be beveled with high abrasion resistance and a low friction coefficient. Acceptable manufacturers and models are: PSI S8G-2 and PSI S12G-2, Power Seal #4810, Cascade CCS series and Advance Products & Systems Model SSI, or approved equal.

5.15 INSULATION

5.15.1 ~~Water main~~Watermain insulation shall meet the requirements of Chapter 8.50.0 of Standard Specifications.

5.15.2 ~~Water main~~Watermain insulation for buried application shall be extruded polystyrene in 2" thickness overlapped at breaks or seams by a 1 foot minimum.

5.15.3 Water pipe insulation for station piping shall be closed cell polyethylene designated for the purpose or wrap and tape with minimum 4 layers of FoamSeal Owens Corning sill plate gasket insulation 1/4" x 3-1/2" wide available in 50' rolls at hardware stores, or equal.

5.16 PIPE INSTALLATION

5.16.1 General Requirements

A. Installation of PVC, HDPE, and DI, ~~water main~~watermain shall conform to Chapter 4.3.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

1. PVC ~~water main~~watermain shall conform to Chapter 4.6.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
2. DI ~~water main~~watermain shall conform to Chapter 4.4.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
3. Directionally Drilled HDPE ~~water main~~watermain and services shall conform to Chapter 6.4.0 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

B. When installation operations are interrupted, or terminated at the end of the day, pipe ends shall be sealed temporarily to prevent the entry of water, debris, small animals, or similar types of contamination.

C. Wrap all ductile iron pipe and fittings according to Chapter 4.4.4 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.16.2 Obstruction in Line or Grade

A. Whenever it becomes necessary to lay a ~~water mina~~watermain over, under, or around a known obstruction, the adjustment procedure will conform to Chapter 4.3.10 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition

5.16.3 Existing ~~Water Main~~Watermains

A. The uncovering of existing ~~water main~~watermains shall be in accordance with Chapter 4.2.2 "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

B. Before excavation of trenches is started, Contractor shall expose the end of the existing ~~water main~~watermain to which the new main is to be connected. This will permit adjustments in line and/or grade to avoid the use of an extra fitting.

C. The exposed end of the existing main must be protected and blocked by the Contractor to prevent blowing out of the plug or cap at the end of the main.

5.16.4 Clearance

A. All acceptable clearances and exceptions are found in the Wisconsin Administrative Code Section NR811.67-811.70. ~~Water main~~Watermains passing through contaminated soils or groundwater must be approved on a case-by-case basis.

5.16.5 Pipe/Joint Deflection

A. Pipe / Joint deflection shall conform to manufacturer's recommendations.

5.17 METER STANDARDS

5.17.1 Scope

~~5.17.2~~A. This design standard covers acceptable designs for ~~water main~~watermain construction. Local, State, and Federal regulations supersede the requirements of this standard. Design parameters not included in this standard or that deviate from this standard must be approved by the City of Mequon Water Utility Planning Engineer (Engineer) prior to final submittal for permit approval.

Formatted: Index 2

5.17.2 Meter Set Design Requirements

Formatted: Outline numbered + Level: 3 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.5" + Indent at: 1"

A. Meter size calculations, provided to the Water Utility Engineer, are required prior to meter delivery.

B. Meter sizing for new construction will be based on fixture counts and maximum design flow calculated from the plumbing code. The design maximum flow will be less ~~then~~than the upper limit of the typical operating range of the meter size selected as specified by AWWA standards. Pressure and flow requirements for the new construction's plumbing fixture will be accounted for in sizing the water lateral and internal plumbing.

C. Meter sizing for existing buildings converting from a private well without an existing service lateral will be based on fixture counts and maximum design flow calculated from the plumbing code. The design maximum flow will be less than the upper limit of the typical operating range of the meter size selected as specified by AWWA standards. Pressure and flow requirements for the existing building's plumbing fixtures will be accounted for in sizing the water lateral. If pressure and flow requirements are not met by adjusting the service lateral size, increasing meter size will be considered at the request of the building owner.

D. All meter sets shall be located within 3 feet of the service piping entrance to the building and within 4 feet of the floor.

E. Meter sets shall have minimum of 3 feet clearance around the meter set except the exterior wall the meter set may be mounted to.

F. Meter sets shall be accessible without using any tools or damaging any surrounding material.

G. There shall be no valves or tees in the service piping or connected to the service piping prior to meter inlet valve.

H. Meter set outlet valves shall be full port valves.

I. Meters will be delivered to the site by the Water Utility and installed by the plumber.

J. Water to a plumbing system may be turned on by the plumber for one hour to wet test the plumbing system without a meter installed. The curb stop and meter inlet valve must remain in the off position until the meter is installed, except for the wet test. No pipe or meter jumper shall remain in the meter set prior to meter installation.

K. A meter will be delivered to the site only after Water Utility confirms all applicable standards and rules have been met. The Water Utility will give notice that the plumbing system may be turned on.

1. Although all standards and rules apply to every service connection, the following are key requirements specifically investigated at the time of meter delivery.

   i. A service application must be signed.
   ii. Prior to activation of water service, the water system must be inspected by the activator and all cross-connections must be eliminated.
   iii. Curb stop and box must be accessible, operable, and adjusted to the correct elevation.
   iv. The Water Utility must own the ~~water main~~watermain the service is connected to, or the privately owned ~~water main~~watermain must meet requirements of this specification.

5.17.3 Meter Set

A. Meters 1 inch and smaller.

1. Meter sets shall have a Mueller Mark II Oriseal Curb Valve H-15172, or approved equal, as the meter inlet valve.
2. Swivels shall be used on the inlet and outlet of the meter horn.
3. A meter horn with a meter spread of 7½ inches shall be installed for meters less than 1 inch, and ~~11~~10-3/4 inches for 1 inch meters.

B. Meters 1½ inch and larger

1. A meter by-pass shall be provided for all meters 1½ inch and larger with a single full port valve on the by-pass and two isolation valves on the meter run.
2. Meter sets for 1½ inch and larger meters shall have a plug test port designed into the meter set piping equal to the outlet size of the meter. The test port shall be a tee with a NPT threaded plug.
3. For meters 1½ inch and larger, contact Water Services for the correct meter spread prior to constructing
4. A strainer shall be installed between the meter inlet valve and the meter.
5. The meter and strainer shall be installed using flanged joints.

5.18 INTERNAL PRIVATE FIRE PROTECTION

5.18.1 At a minimum, double check backflow protection must be provided for all private fire protection.

5.18.2 The fire line may tee off upstream from the meter for domestic water supply. A double detector check meter assembly is required whenever the fire line is upstream of the meter for domestic water supply.

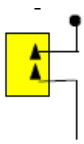
5.18.3 Private fire protection rate {shall/shall not} apply if the fire protection line is downstream of the meter for domestic water supply.

5.18.4 Written testing notice of the backflow prevention device must be provided to the Water Utility each calendar year not to exceed 15 months.

5.19 EXTERNAL PRIVATE FIRE PROTECTION

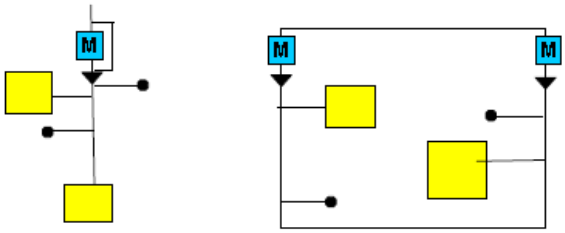
5.19.1 Privately owned external fire system must conform to one of the following categories:

A. Building Division



1. ~~At a minimum, double check~~ Reduced Pressure Zone backflow protection must be provided. A ~~double detector check~~ Reduced Pressure Zone meter assembly is also required.

B. Common Private Fire / Service



1. At a minimum, single check backflow protection must be provided for external fire protection systems.
2. The large meter on a compound meters must be designed to handle internal and external fire demands.
3. Private systems with only one connection to the Water Service system must have a by-pass equal to the meter run.

5.19.2 Written testing notice of the backflow prevention device, system maintenance, and flushing gallons must be provided to the Water Utility each calendar year.

5.20 FIRE CISTERNS

(Subdivisions without public water or Community Water System need to have Fire Chief review.)

5.20.1 Fire protection improvements shall require the installation of a fire cistern or cisterns determined by and meeting the Fire Chief's approval.

5.20.2 A 30,000 gallon fire cistern (see Figure 11 in Appendix A) shall be installed within a 1,000' hose radius from a residence. This may require more than one cistern per development.

5.20.3 All cisterns shall have a dry hydrant connection which is to be located no more than 10' from the edge of pavement. The dry hydrant shall be a Kochek Model No. Kocdhf-611 or equivalent as approved by the Fire Chief. All cisterns require separate drain and fill connections.

5.20.4 All fire cisterns shall be located in a public road right-of-way.

5.20.5 All fire cistern installation locations shall be approved by the Fire Chief.

5.21 TESTING & DISINFECTION

5.21.1 General Requirements

A. Hydrostatic testing should be made in accordance with Chapter 4.15.0 "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

B. Disinfection testing should be made in accordance with Chapter 4.16.0 "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.21.2 Hydrostatic Testing

A. Pressure and leakage testing shall be in accordance with the latest edition of A.W.W.A. Standard C600.

B. Pressure testing of the installed pipe shall be completed under Owner's supervision.

C. Following examination of exposed parts of the system ("wet-hand" test); the test pressure will be increased to 150 psi read at the point of lowest elevation on the main for duration of one hour. There should be no noticeable pressure drop in the test section.

D. If it is found unnecessary to add water during the duration of the pressure test, the Engineer may waive the leakage test.

E. If leakage test is not waived, test shall be in accordance with Chapter 4.15.3 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.

5.21.3 Disinfection Testing

A. All new, cleaned or repaired ~~water main~~watermains shall be disinfected in accordance with A.W.W.A. Standard C651 and Wisconsin Administrative Code NR 811.07 (3).

B. The new ~~water main~~watermain can remain disconnected from the existing main until disinfection and final bacteriological tests have been completed. The water required for hydrostatic testing, disinfection, and flushing would be supplied through a temporary connection controlled by a control valve at a hydrant that is separated from the existing water system.

C. If approved by the City, the new ~~water main~~watermain can be connected to the existing main during construction for disinfection purposes. Contractor will submit to the City, backflow protection procedure to keep contaminated water from entering the existing main .

D. Methods of Chlorination

1. Tablet - Hypochlorite tablets can be used during construction in accordance with Chapter 4.3.12 of "Standard Specification for Sewer & Water Construction in Wisconsin" latest edition.
2. Continuous feed - This method consists of placing calcium hypochlorite granules in the main during construction, completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and filling the main with potable water. Chlorine concentration should be tested at regular intervals downstream of where the water is added to verify the minimum free chlorine residual does not drop below 25 mg/l.
3. Slug - The procedure is similar to the continuous-feed method except the dose of chlorine fed at a constant rate increases the concentration to 100mg/L. The

chlorinated water slowly flows through the pipe for at least 3 hours, exposing all interior surfaces to the high concentration. Valves and hydrants should be treated with this water also. During the 3 hour period, the water should have a residual of 50 mg/L free chlorine or more.

E. Flushing

1. The flushing velocity in mains shall be greater than 2.5 ~~ft~~ft./s. The following table gives the flow rates required to produce the flushing velocity in some typical pipe sizes:

Required flow and openings to flush pipelines (40 psi residual pressure in main)*

Pipe Diameter (inches)	Flow required to produce 2.5 ~~ft~~ft./s in main (gpm)	Tap Size (inches) 1	1-1/2	2	Number of 2-1/2 inch hydrant outlets
		Number of taps on pipe			
4	100	1	--	--	1
6	200	--	1	--	1
8	400	--	2	1	1
10	600	--	3	2	1
12	900	--	--	3	2
16	1,600	--	--	4	2

*With a 40 psi pressure in the main and the hydrant flowing to atmosphere, a 2½ hydrant outlet will discharge approximately 1000 gpm; and a 4½ hydrant outlet will discharge approximately 2500 gpm

F. Bacteriological Test (5)

1. After final flushing and before the new ~~water main~~watermain is connected to the distribution system, two consecutive sets of acceptable samples, taken 24 hours apart, shall be collected from the main. A set is made up from groups of samples collected every 1,200 feet of new main, groups of samples taken at each branch, and a group of samples taken at the end of the line.
2. All samples shall be collected in sterile bottles treated with sodium thiosulfate as required by the Standard Methods for the Examination of Water and Wastewater. A suggested combination ~~blowoff~~blow off and sampling tap is useful for mains up to 8 inches in diameter. A corporation cock may be installed on the main with a copper-tube gooseneck assembly. No hose or hydrant shall be used to collect samples.
3. All samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and shall be void of coli form organisms.
4. If trench water or excessive quantities of dirt and debris have entered the new main during construction, bacteriological samples may be taken at marked intervals of 200 feet. Any water left in the main for 16 hours or more must be tested for bacterial contamination.

CHAPTER 6

GRADING AND DRAINAGE

6.0 SUBDIVISION GRADING

6.0.1 Construction lot pads shall be graded 12” to 18” below finished yard grade. Construction lot pad elevation shall be determined by the developer/engineer based on the amount of basement spoil to be generated by each house.

6.0.2 Fill areas shall be compacted in one foot lifts to 95% of the modified proctor. A soil testing firm, selected by the City, paid by the developer shall check compaction during the entire filling operation. At the end of the filling operation the soil testing firm shall submit a final certification report to the City Engineering Division~~Department~~.

6.0.3 No topsoil shall be removed from the site without prior approval by the City Engineer.

6.0.4 Organic material shall be removed and stockpiled prior to placing structural fill.

6.0.5 The minimum depth of topsoil shall be four (4) inches.

6.0.6 Filling operations requiring three or more feet of fill (measured from structural material below topsoil) shall require construction observation during placement.

6.0.7 Excavated basement spoil material shall not be placed any closer than ten (10') feet to lot corner or lot lines.

6.1 EROSION CONTROL

6.1.1 Grading and erosion control shall conform to the latest edition of the Storm Water Management Technical Standards, distributed by the Wisconsin Department of Natural Resources Bureau of Water Resources Management. (Appendix B.)

6.1.2 An approved City of Mequon erosion control permit must be obtained through the Engineering Division~~Department~~ prior to any land disturbing activities taking place.

6.2 DITCH GRADING

6.2.1 Grass ditches shall have a minimum flowline gradient of 1% and a maximum of 5%. Less than 1% requires special design considerations and prior approval by the Engineering Division~~Department~~.

6.2.2 Restoration of ditches with a flowline gradient between 1% and 3% requires topsoil and seed restoration; greater than 3% requires erosion mat or other stabilization.

6.2.3 Roadside ditches shall be a minimum of 27" deep and a maximum of 39" deep as referenced from the centerline elevation of the finished road. Ditches greater than 39" deep shall be piped.

6.2.4 Crossroad culverts shall be designed to provide a minimum of 16" of cover as referenced from the centerline elevation of the finished road to the top of the pipe.

6.2.5 Side slopes of roadside ditches shall be graded no steeper than three feet horizontally to one foot of rise (3:1). Back slopes of roadside ditches and side slopes of other ditches shall be graded no steeper than 3 feet horizontally to 1 foot of rise (3:1).

6.2.6 Roadside ditches or storm sewer shall be sized to convey a ~~4% probability~~25-year-24 hour post developed storm event. Calculations shall be provided with construction plans.

6.2.7 Crossroad culvert drainage systems shall be sized to convey a ~~2% probability~~50-year-24 hour post developed storm event. Calculations shall be provided with construction plans.

6.2.8 Off road drainage ways affecting the buildable area of any lot or greater than 36" deep between home sites shall be piped.

6.2.9 Existing ditches fronting on existing roadways or existing drainage ways within proposed developments shall be regraded to conform to these specifications. This requirement may be waived by the City Engineer.

6.2.10 All cul-de-sacs shall have an 8" minimum storm sewer pipe with a 12" minimum catch basin installed to drain island to outside ditch or storm sewer system. (Location and materials determined by design engineer and approved by City of Mequon) See detail drawing Figure 3.

6.3 PUBLIC AND PRIVATE STORM SEWER

6.3.1 Materials and installation shall conform to the latest edition of the Standard Specifications for Sewer and Water Construction.

6.3.2 The minimum design storm for all conduits shall be ~~Southeastern Wisconsin Regional Planning Commission (SEWRPC)~~NOAA Atlas 14 -10-year, 24-hour event with a rainfall duration equal to the minimum time of concentration or five minutes, whichever is greater. Storm Sewer sizing calculations including hydraulic grade line must be submitted with the Construction Plan set. Hydraulic grade line shall be at least 1-foot below the top of the storm ~~strucutres~~structures. See WisDOT Facilities Design Manual (FDM) 13-25 for sizing procedure and guidelines.

6.3.3 Inlet capacity calculations are required with the construction plans. No clogging factor shall be used in paved areas, 25% clogging factor should be used in grasses swales and wooded areas.

~~6.3.3~~6.3.4 Storm sewers to have a minimum cover of 18 inches.

~~6.3.4~~6.3.5 Public ~~S~~storm sewer pipe must have a minimum diameter of 12 inches with the exception of island drains. Any pipes collecting surface drainage (public or private) shall be a minimum of 12 inches in diameter.

~~6.3.5~~6.3.6 Manholes and catch basins shall be designed and constructed so as to allow easy access for maintenance and cleaning. Easy access is defined as any structure conforming to File No. 28 of the latest edition of the Standard Specifications for Sewer and Water Construction.

~~6.3.6~~6.3.7 Catch Basins

A. Catch Basins at intersections shall be 1 ft. from the end of curb and gutter radius.

B. Catch Basin spacing – maximum of 300 feet from crest of hill or previous inlet structure so as to limit the maximum travel distance to 300 feet.

C. Catch Basins shall be located on the upstream side of the radii, upstream of sidewalks/bike paths, and low points of an intersection.

D. Minimum 18" sump.

E. Catch Basin frames installed with 30" roll back curb and gutter will be Neenah R3501-R or equivalent and shall be set two (2") inches below finished road grade in development with sanitary sewer. When the asphalt surface is applied, the inlets shall be raised to finish grade. (See Figure 7, Appendix A.)

~~6.3.7~~6.3.8 Manholes

A. Manhole spacing shall not exceed 400 feet.

B. Storm sewer manholes shall have a minimum 18" sump.

~~6.3.8~~6.3.9 End walls, flared end sections, or junction structures shall be required at crossroad culverts and piped installations through or between lots. Riprap shall be required at outfalls with an incoming flow gradient of 5% or more or a peak flow of 10CFS or greater. Rip Rap and/or energy dissipation calculations shall be provided with construction plans.

~~6.3.9~~6.3.10 No plastic end walls will be allowed.

6.4 SUMP PUMP DRAINS

6.4.1 New developments shall provide proper facilities for future sump pump discharge pipes from each structure per plumbing ordinance Section10-115.

6.4.2 Sump pump collector systems shall include a front roadside ditch, or a storm sewer with connections, or a collector pipe leading to an approved drainage way.

6.4.3 Sump pump collectors shall be a minimum 6" diameter smooth walled PVC pipe . No ribbed pipe less than 12" shall be allowed.

6.4.4 Installation shall conform to Figures 9 and 10 located in Appendix A, and shall be inspected and approved by the Engineering Department.

6.4.5 Where installations cross platted lots, easements shall be provided on the recorded plat. These must not conflict with other public utilities or private easements.

6.4.6 Clean outs shall be provided at least every 100' on pipe sizes 10" or less; catch basins or equivalent shall be provided on systems 12" or larger to accommodate pipe thawing or cleaning equipment.

6.4.7 The City reserves the right to require off road drainageways to be enclosed and piped.

6.5 ON SITE STORM WATER DETENTION

~~6.5.1~~ Refer to Appendix B.

6.5.1

Formatted: Index 1

CHAPTER 7

FILLING, EXCAVATING, AND BERMS

7.0 GENERAL

7.0.1 No person, firm or corporation shall transfer to dump or place upon any lands, public or private, solid fill within the limits of the City of Mequon without first obtaining a permit in compliance with Engineering Division policies and specifications. Filling and excavation shall be in compliance with article VIII, Section 58-671 to 58-678, of the Mequon Code of Ordinances.

7.0.2 Preservation of topography. No change in topography of any land shall be permitted which would result in increasing any portion of the slope to a ratio steeper than one and one-half (1½) feet horizontal to one (1) foot vertical within a distance of five (5) feet from an adjoining property line, except with the written consent of the abutting property owner(s) and approval by the city engineer.

7.1 LAND DISTURBING ACTIVITIES

7.1.1 The construction of berms, earth moving, grading, land disturbing activities and filling shall comply with article VIII, Section 58-674, erosion and storm water run-off control regulation.

7.1.2 The applicant must complete and file with the City an Erosion Control Permit Application, an Application for Filling, Excavating, Berm Construction or Grading, and provide construction plans.

7.1.3 Plans must be submitted in compliance with the City of Mequon's Standard Specifications for Land Development – Chapter 2.

7.1.4 An application which limits fill to less than one-thousand (1,000) cubic yards may be approved by staff. Land disturbing activities requiring fill in excess of 1,000 cubic yards shall submit a plan to the Planning Commission for review and approval.

7.1.5 The city engineer may waive the permit requirement at his/ her discretion wherein the permit application seeks approval for less than twenty-five (25) cubic yards of fill and the city engineer is reasonably satisfied that there is no significant likelihood of adverse impact on drainage affecting adjoining properties.

7.1.6 All land disturbing activities shall comply with the Storm Water Management Technical Standards developed by the Wisconsin Department of Natural Resources.

7.1.7 A permittee under this section shall file a Water Resources Application for Project Permit (WRAPP) and shall follow the WDNR submittal process and procedures.

7.1.8 The applicant is responsible for obtaining any permit or approval required for the project by local zoning ordinances, WDNR, or by the U.S. Corps of Engineers before starting the project.

7.1.9 A permittee under this section shall notify the Engineering Division before starting any land disturbing activity and again not more than five days after the project is complete.

Formatted: Heading 3, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Font: Not Bold

Formatted: Index 1, Indent: First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Heading 3, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.5" + 1"

Formatted: Index 1

Formatted: Index 1, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.5" + 1"

Formatted: Font: 12 pt

Formatted: Index 1

7.1.10 Permit closure inspections shall indicate that the amount of fill or excavation was placed in accordance with the permit. Contact the City of Mequon Engineering Division within 5 days of completion for closure inspection. Final documentation of permitted activities to be provided to the City no more than 10 days after final completion. Permit is closures are based on the following:

A. 0-250 C.Y. – Visual inspection by City Staff

B. 251-1,000 C.Y. –Material volume certification (i.e. truck tickets) provided by the applicant and reviewed by City staff

C. Greater Than 1,001 C.Y. – Record drawings prepared by a Registered Land Surveyor in the State of Wisconsin. Drawings shall conform to the standard specifications for Land Development Grading Record Drawings (Section 8.4).

7.2 BERMS

7.2.1 Construction of a berm(s) shall require a Filling, Excavating, Berm Construction or Grading Permit from the Engineering Division. The City's Landscape Architect consultant may also be required to review more extensive plans.

7.2.2 No berm/land disturbing activity shall be permitted that by reason of noise, dust, odor, appearance, or other objectionable factors, creates a nuisance or a substantial adverse effect upon the property value or reasonable enjoyment of surrounding property.

7.2.3 The construction of the berm shall not adversely affect drainage of surrounding properties.

7.2.4 Single family residential subdivision restrictions may be more restrictive. If a single family residential subdivision has restrictions on the construction of berms, the subdivision must approve or conditionally approve the berm plan and acknowledge their approval to the engineering department prior to any city approval. The City of Mequon does not enforce single family residential subdivision covenants and restrictions regarding the construction, landscaping, or maintenance of berms.

7.2.5 Berm requirements shall also apply to modifications to any existing berms.

7.2.6 The construction of earth berms shall be permitted subject to the following:

A. Berm(s) shall not exceed four and one-half (4½) feet in vertical height. The nearest toe of the berm shall be located at least ten feet from a side or rear lot line and five feet from the road right-of-way. The offset requirements from a side or rear lot line may be waived in the case of the joint construction of a berm by adjacent property owners. An earth berm exceeding four and one-half (4½) feet in vertical height shall be permitted only after approval of the Planning Commission.

B. All berms shall be constructed such that the width of the base of the berm shall be no less than three times the vertical height of a berm. The vertical height of a berm shall be measured from an average of the existing ground grades on either side of the berm.

C. All berms shall be constructed such that the side-slopes shall be graded no steeper than four (4) feet horizontal to one (1) foot vertical. The vertical height of a berm shall be measured from an average of the adjacent preconstruction ground elevations on either side of the berm to the top of the berm. Berms shall also be designed to provide a natural appearance, with a serpentine and undulating grade.

Formatted: Index 1, Left, Indent: Left: 0", Tab stops: Not at 1.5"

Formatted: Font: 12 pt

Formatted: Heading 3, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Font: 14 pt

Formatted: Index 1

Formatted: Index 1, Add space between paragraphs of the same style, No bullets or numbering, Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.5" + 1"

Formatted: Font: 12 pt

Formatted: Font: 12 pt

D. A cover growth of City approved plant material or mulching, containing no noxious weeds, shall be immediately established over the entire land disturbed area to prevent erosion or unsightly conditions.

1. Ground covers shall be planted and spaced to result in total coverage of the majority of the required landscape area within three (3) months. Ground cover plants other than grasses must be at least the four (4) inch pot size and must be planted at a rate of one per twelve (12) inches on center, in triangular spacing.
2. Landscape plantings shall be spaced randomly to help visually break up the continuous line of the berm.
3. Prairie Landscaping. The use of prairie, wet meadow sedge, wildflower and tall grass prairie ground covers on berms shall require a narrative that includes:
4. The seed source
5. The seed mixture
6. The proposed nurse crop
7. The planting time line
8. The maintenance requirements for years 1-5.

Formatted: Font: 14 pt

Formatted: Font: 14 pt

Formatted: Font: 12 pt, No underline

Formatted: Index 3, Left, Indent: Left: 0", Line spacing: single, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.5" + 1"

Formatted: Font: 14 pt

7.3 RECREATIONAL AND AESTHETIC PONDS

7.3.1 Construction of a recreational or aesthetic pond shall require a permit from the Engineering Division.

Formatted: Index 1

Formatted: Font: 12 pt

7.3.2 The property owner shall submit a pond plan that identifies maximum pond size, maintenance plan, pond depth, and pond overflow point, placement of excavated material, erosion control devices and final grading for Engineering Division review and approval.

7.3.3 For ponds that serve as a storm-water management facility the design shall follow MMSD, WDNR and City of Mequon standards.

7.3.4 The construction of new recreational or aesthetic ponds or enlargement of existing recreational or aesthetic ponds shall be subject to the following:

A. A minimum four (4) foot wide safety shelf with a maximum depth of twelve (12) inches shall be constructed.

B. The slopes leading to the pond edge shall be landscaped with materials which provide adequate traction for foot traffic, avoiding slippage above the permanent waterline.

C. The pond buffer shall be set back no less than thirty (30) feet from the property line. The high watermark of a pond may not fall within a (periphery) buffer yard. The Planning Commission has the authority to require reasonable conditions including increased set-backs. The set-back requirements may be reduced or waived by staff or the Planning Commission in the case of the joint construction of a pond by adjacent property owners.

D. The outside pond slope shall be no steeper than five (5) feet horizontal to one (1) foot vertical above the permanent water surface level and three feet horizontal to one foot vertical below the safety shelf.

E. The area of the pond at the ordinary high water mark shall be no greater than twenty percent (20%) of the total lot area.

Formatted: Font: 12 pt

Formatted: Index 1, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers, Tab stops: Not at 0.5" + 1"

Formatted: Font: 12 pt

Formatted: Font: 12 pt

F. All detention/retention ponds shall have a buffer and landscape plan.

7.4 RETAINING WALLS

7.4.1 Retaining walls are structures that are constructed to support almost vertical (steeper than 70 degrees) or vertical slopes of earth masses.

7.4.2 The construction of retaining walls shall be subject to the following:

A. Retaining walls shall have a minimum offset of three (3) feet from an adjoining lot line and five (5) feet from a street right-of-way or the fall height of the wall whichever is greater. This offset may be increased by the city engineer if the physical conditions of a property, such as drainage or trees, require a larger offset.

B. Retaining walls in excess of 3 feet in height require retaining wall design and certification by a State of Wisconsin Professional Structural Engineer.

Formatted: Heading 3, Indent: Left: 0", First line: 0", Widow/Orphan control, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Default Paragraph Font, Font: (Default) Times New Roman, Not Bold, Font color: Auto, Pattern: Clear

Formatted: Font: 12 pt

Formatted: Font: 12 pt

CHAPTER 8

RECORD DRAWINGS

6.68.0 GENERAL

8.0.1 The City shall be provided with electronic files of all record drawings. These files must be compatible with AutoCadAutoCAD LT 20150 in DWG format. The file shall be in NAD 83 State Plane Coordinates.

A. The electronic files shall include:

1. Lot lines and ROW (from design)
2. Sanitary sewer alignment, structures, laterals, and elevations
3. Water distribution alignment, structures, and laterals
4. Storm sewer alignment, structures, laterals, sumps and elevations
5. Dimensions, pipe length, slopes, fittings and Stormwater BMPs
6. Edge of pavement (from design)
7. Centerline (from design)

6.6.1

6.78.1 SANITARY SEWER RECORD DRAWINGS

6.7.18.1.1 As-built plans must comply with MMSD Standards.

A.8.1.2 Sanitary sewer record drawings should include the following:

A. Title Block to include

1. MMSD File Number
2. MMSD Plan Approval Date
3. Name of road(s) facilities are located in
4. Where in that road they are located (ie.i.e. From / To)
5. Name of Contractor that built facilities
6. Date of Construction
7. Drawn by, Checked by and Scale
8. Engineer's Stamp

B. General Notes to include:

1. Name of Development in upper right hand corner
2. External manhole seals extending from casting to cone
3. Main line size and material
4. Lateral size and material

C. Length of lateral from the main line

D. Approximate depth and elevation of lateral at lot line

E. Adjoining as built file numbers

F. City of Mequon manhole numbers

F.G. Rim and invert elevations

Formatted: Not Highlight

Formatted: Index 2

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Index 3

Formatted: Highlight

Formatted: Index 1, Left, Add space between paragraphs of the same style, No bullets or numbering, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

1. New manholes should be in bold print
2. Existing manholes should be in standard print

~~G.~~H. Two ties to the end of every lateral. Ties must be to an above ground reference point.

~~H.~~I. Distance from a manhole to a lateral should be labeled on the same side as the lateral itself. The overall distance between manholes should be in parenthesis. This can be located on either side of the main line.

~~I.~~J. Other criteria to follow include:

1. Paper size should be 12" x 36"
2. Page breaks should always be at manholes, never between manholes
3. Only sanitary sewer main line, laterals and manholes described on that ~~page should~~page should be in bold line weights. Connecting main line and manholes ~~should be~~should be in standard line weights.

Formatted: Index 3, Left, Indent: Left: 0", Line spacing: single

~~6.8~~8.2 WATER DISTRIBUTION SYSTEM RECORD DRAWINGS

~~6.8.1~~8.2.1 ~~Water main~~Watermain record drawings should include the following information:

A. Title Block

1. Name of road(s) facilities are located in
2. Where in that road they are located (i.e. From / To)
3. Name of Contractor that built facilities
4. Date of Construction
5. Drawn by, Checked by and Scale
6. Engineer's Stamp

~~A.~~

B. General notes to include:

1. Name of Development in upper right hand corner
2. Main line size, and material
3. Lateral location, size, material and curb stop elevation
4. Watermain fitting, valve, and hydrant invert elevation
5. Distance from ROW centerline to the watermain
6. Distance along the main from a fitting, valve, grade break, hydrant lead, to the next fitting, valve, grade break, or hydrant lead.
7. ~~7.~~ Lot Number, Parcel ID and/or Address of Water Service

C. City of Mequon structure numbers

~~6.~~

Formatted: Index 1

~~6.8.2~~8.2.2 A full-time inspector shall be located at the job site during construction of the watermain and laterals. The contractor responsible for the construction of the water distribution system~~sanitary sewers~~ and water service laterals is also responsible for notifying the City per the notification policy of the City of Mequon. (See Appendix E)

8.2.3 All ~~water main~~watermain record drawings~~plans~~ are required to be reviewed and approved by the City

~~6.9~~8.3 STORM SEWER RECORD DRAWINGS

~~6.9.1~~8.3.1 Storm sewer record drawings shall include the following:

A. The plan shall consist of a system plan at a 1"=100' scale.

B. All appurtenances relating to storm sewer.

C. Main type, size and length.

D. Sump line type, size, cleanouts and lateral locations.

E. Catch basins, manholes, type of construction.

F. Rim elevations and invert elevations at all manholes/catch basins.

G. Subdivision lot numbers consistent with final plat.

H. Edge of pavement, right-of-way.

I. Street name.

J. Name of contractor, date construction was complete.

K. Name of inspector, firm.

L. Subdivision name.

M. Storm sewer easements and widths.

~~6.10~~8.4 GRADING AND DRAINAGE RECORD DRAWINGS

~~6.10.1~~8.4.1 After finished grading is accomplished, a grading record drawing shall be accomplished to verify conformance with the approved grading plan. The drawing shall consist of the following:

A. Use approved grading plan as the base sheet. Denote "Grading Certification" in bold letters at the top and specify the firm doing the as-built. Cross out the name of the design firm if different than firm doing the grading certification.

B. Spot elevations in the center of all lot pads to the nearest tenth of a foot.

C. Spot elevations at all property corners to the nearest tenth of a foot.

D. Storm sewer culvert invert elevations to the nearest hundredth of a foot.

~~E.~~ Typical ditch cross section at every even station (i.e. edge of pavement, flowline of ditch, and top of bank) to the nearest tenth of a foot.

E.

~~F.~~ Berm elevations, top of bank and toe of slope, to the nearest tenth of a foot.

F.

Spot elevations at all high and low points to the nearest tenth of a foot.

G.

Formatted: Index 2

Formatted: Normal

Formatted: Normal

Formatted: Not Highlight

Formatted: Heading 1, Left, Indent: Left: 0", First line: 0", Line spacing: single

APPENDIX A

Detail Drawings

Formatted: Normal, Centered, Indent: Left: 0", Hanging: 0.5", Line spacing: At least 12 pt

Formatted: Heading 3, Centered

Figure 1-Typical Residential Street Cross-Sections
Figure 2-Residential Street Cross-Sections (Conservation Subdivisions)
Figure 3-Typical Residential Street Cul-de-sacs
Figure 4-Entrance Island
Figure 5-Acceleration /Deceleration Lanes & Intersection Bypass Lane
Figure 6-Concrete Curb and Gutter
Figure 7-Curb Inlets
Figure 8-Temporary Asphalt curb wedging
Figure 9-Sump Collector Clean Out
Figure 10-Sump Line
Figure 11-Fire Cistern Detail
Figure 12-Bike Path
Figure 13-Concrete Invert
Figure 14-Riprap Flume
Figure 15-Sediment Basin with Standpipe (5 Acres or more)
Figure 16-Sediment Trap with Standpipe (Less than 5 Acres)

Formatted: Font: Times New Roman, 16 pt
Formatted: Heading 2

APPENDIX B

Erosion and Stormwater Runoff Control Regulations

Formatted: Font: 14 pt
Formatted: Heading 3
Formatted: Font: 14 pt, Not Bold

The latest version of the City Of Mequon Erosion and Storm Water Runoff Control regulations can be found at the below link:

https://www.municode.com/library/wi/mequon/codes/code_of_ordinances?nodeId=PTIICOOR_CH58PLDERE_ARTVIIIERSTRUCO

Wet Detention Basin D.N.R. Code 1001

Formatted: Font: 14 pt
Formatted: Font: 14 pt, Not Bold
Formatted: Heading 3

The latest version of the WDNR Wet Detention Basin Code 1001 can be found at the below link:

http://dnr.wi.gov/topic/stormwater/documents/wetpondstd1001.pdf

Land Application of Anionic Polyacrylamide D.N.R. Code 1050

Formatted: Font: 14 pt
Formatted: Heading 3
Formatted: Font: 14 pt, Not Bold

The latest version of the WDNR Land Application of Anionic Polyacrylamide D.N.R. Code 1050 can be found at the below link:

http://dnr.wi.gov/topic/stormWater/documents/dnr1050-polyacrylimide.pdf

APPENDIX C

MMSD Rules and Regulations
Chapter 13 Surface Water and Storm Water

Formatted: Font: 14 pt
Formatted: Heading 3
Formatted: Font: 14 pt, Not Bold
Formatted: Font: 14 pt
Formatted: Font: 14 pt, Not Bold

The latest version of the MMSD Chapter 13 Surface Water and Storm Water Rules and Regulations can be found at the below link:

http://www.mmsd.com/-/media/MMSD/Documents/Rules%20and%20Regs/Rules/Chapter13_March_2014.pdf

APPENDIX D

Street Tree Planting and Tree Preservation Regulations

Formatted: Heading 3, Centered

The Developer shall comply with the most current Ordinance as it pertains to submittal of landscape plans, removal of trees, and replacement landscaping and installation. The Ordinance is available in the Community Development Department at Mequon City Hall.

APPENDIX E

Notification Policy

Formatted: Title, Left, Line spacing: single

Formatted: Font: 14 pt, Not Bold

Notification Policy

A. Preconstruction Meeting

A preconstruction meeting shall be held a minimum of five working days prior to the start of the development construction. All involved contracts, design engineers and/or surveyors shall attend. The owner(s) may attend at their option. A three day notice shall be required to set a date for the meeting.

B. Sanitary Sewer and Wisconsin Gas Water Service

The City of Mequon Engineering Division~~Department~~ shall be notified at least three working days prior to the start of any sanitary sewer or watermain construction. If a consulting firm is being used by the City for sanitary sewer or watermain inspection, then the contractor shall also notify the consulting firm, per their requirements.

C. Roadway and Asphalt-Paving Inspection

The City of Mequon Engineering Division~~Department~~ shall be notified at least three working days prior to the required sub-grade or finished gravel grade inspection and grade check. Due to the increasing amount of construction in the City, the City will no longer guarantee same day inspections. Any restaking that is needed for the City to perform their inspections will result in a postponement of the inspection and a rescheduling of the inspection to the next available time. Prior to City inspections, the contractor shall have the project surveyor provide adequate horizontal and vertical control throughout the entire project area. This control will be maintained from the start of the project to the end of the project. The City of Mequon Engineering Department shall be notified at least three working days prior to the start of any asphalt paving.

D. General

The scheduling of inspections for Section B and C is done on a first come, first serve basis. The City of Mequon Engineering Division~~Department~~ intends to enforce the three working day notification policy. The practice of one day notification to the Engineering Division~~Department~~ will no longer be tolerated. If a contractor has encountered problems (i.e. weather, equipment, ~~schedule~~and schedule) and wants to call off an inspection he should do so as soon as possible. If an inspection has been scheduled and for some reason the contractor does not show up or isn't ready and does not call to cancel the appointment, the developer will be billed for a minimum of two (2) hours of time for a two-man survey crew, and another three working days notification for inspection may be required. The contractor that is responsible for the work that is to be ~~inspected,~~inspected is responsible for the compliance of the three day notification.

sd/dp
4/17/97

APPENDIX F

Chapter 13 Surface Water and Storm Water Reviews Storm Water Management Plan Submittal Checklist

The latest version of the MMSD Chapter 13 Surface Water and Storm Water Reviews Storm Water Management Plan Submittal Checklist can be found at the below link:

http://www.mmsd.com/-/media/MMSD/Documents/Rules%20and%20Regs/Manuals/Revised%20Submittal%20Checklist_revNov2010.docx

Formatted: Font: (Default) Times New Roman, 14 pt

Formatted: Heading 3, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Font: (Default) Times New Roman, 14 pt, Not Bold

Formatted: Font: (Default) Times New Roman, 14 pt

Formatted: Font: (Default) Times New Roman, 14 pt, Not Bold

Formatted: Normal, Centered

Formatted: Normal

Formatted: Normal