

ENGINEERING DESIGN STANDARDS

for

CITY OF VICTORIA

STREET DESIGN AND GEOMETRICS

- **Geometric Design, Local Residential Street**

 - Minimum Street Width, back of curb to back of curb.....28-feet
 - Center Crown.....3.0%
 - Minimum Longitudinal Grade.....0.5%
 - Maximum Longitudinal Grade.....8%
 - Maximum Intersection Approach Grade, First 100-feet.....2.0%
 - Minimum Vertical Curve Length, Crest.....K=19
 - Minimum Vertical Curve Length, Sag.....K=37
 - Minimum Horizontal Curve Radius.....100-feet
 - Intersection Angles.....90 degrees
 - Minimum Intersecting Street Offset, from Centerlines.....150-feet
 - Curb Radius, Minimum Local to Local.....20-feet
 - Curb Radius, Minimum Local to Collector.....25-feet
 - Minimum Diameter of Cul-de-sac.....90-feet
 - Minimum Grade around Cul-de-sac.....0.5%
 - Maximum Cul-de-sac Street Length.....1000-feet
 - Temporary Cul-de-sac at plat line.....Required
 - Pedestrian Ramps.....Per Current MnDOT Standards

- **Geometric Design, Collector Street**

 - Design Standards.....Meeting State-Aid for minimum design speed
 - Minimum Street Width, back of curb to back of curb.....Varies (32-feet min)
 - Maximum Longitudinal Grade.....6%
 - Intersection Angles.....90 degrees
 - Tangent Length at Intersection from Curb Line, Local Streets.....50 feet
 - Tangent Length at Intersection from Curb Line, Higher Class Streets.....100 feet
 - Tangent Minimum between curves.....50 feet
 - Minimum Vertical Curve Length, Crest.....Meeting State-Aid for minimum design speed
 - Minimum Vertical Curve Length, Sag.....Meeting State-Aid for minimum design speed
 - Minimum Horizontal Curve Radius.....Meeting State-Aid for minimum design speed
 - Minimum Intersecting Street Offset, if allowed, from Centerlines.....250-feet
 - Street/Roadway Access.....Per City Access Management Spacing Guidelines
 - Driveway Access, Residential.....Prohibited
 - Driveway Access, Commercial..... Per City Access Management Spacing Guidelines
 - Curb Radius.....25-feet

- **Pavement Section Design**
 - Subbase, Select Granular Borrow (SPEC 3149.2B)..... 24-inches
 - Subsurface Drainage System.....Required
 - Base, Aggregate Base, Cl. 6 100% Stone Aggregate.....8-inches
 - *Note: Class 6 Recycled Material Substitute by City Engineer Approval*
 - Non-Wearing Course, MnDOT 2360 Type SP 12.5, Mixture 2B.....2-inches
 - Wearing Course, MnDOT 2360 Type SP 9.5, Mixture 2B.....1½-inches

- **Drainile/Street Subsurface Drainage**
 - Type.....SCH 40 PVC Perforated
 - Size.....6-inch
 - Sock.....MnDOT SPEC 3733
 - Location.....Full Length of Street
 - Cleanouts.....Every 300 Feet and at high points.

- **Curb and Gutter**
 - Material, All Purposes.....Concrete
 - Strength, Minimum Requirements.....3,900 PSI
 - Type, New Developments, Single Family Residential.....Surmountable
 - Type, New Developments, Multifamily, Commercial.....B618
 - Type, Collector Roads, Reconstruction.....B618

- **Utility Conduit**
 - Type.....PVC Schedule 40
 - Location/Depth.....Perpendicular to Street and below Street Subgrade and Drainile

- **Entrances/Driveways**
 - Maximum Driveway Width at Right-of-way.....24-feet
 - Bituminous Driveway Minimum Thickness, Section.....See detail
 - Residential Concrete Driveway Minimum Thickness.....6-inches
 - Commercial Concrete Driveway Minimum Thickness.....8-inches

- **Signing**
 - Design Standards.....MN MUTCD
 - Sheathing Type.....High Intensity Diamond Grade DG3
 - Sign Posts, unpainted galvanized metal.....3.0 LBS./ft.

RIGHT-OF-WAY AND BOULEVARD LAYOUT

- **Right of Way Widths**
 - Local Residential Street Minimum Width.....60-feet
 - Cul-de-sacs.....60-foot radius
 - Collector Street Minimum Width.....Varies (77 feet Minimum)

- **Boulevard, Local Residential Street**
 - Width.....16-feet
 - Slope, Typical and Maximum.....4% and 4:1
 - Topsoil Minimum.....6-inch
 - Turf Treatment.....Reference Section 3292 and Standard Detail 805
 - Turf Treatment (Boulevards along City owned property).....Lawn Sod

 - Tree LocationAs Directed - No trees in sight triangle at intersections
 - Root BarrierAdjacent to walkway and/or back of curb within ROW, and as directed by City
 - Street Light Location.....5-feet back of curb
 - Hydrant Location.....5-feet back of curb

- **Sidewalks**
 - Collector Street.....As directed
 - Local Residential Street.....Required on one side
 - Cul-de-sac Street.....Required for trail connection
 - Width.....6-feet
 - Sidewalk Maximum Longitudinal Grade.....5%
 - Pavement Section.....5-inch Concrete; 4-inch Select Granular

- **Trails**
 - Locations.....Per City trail plan and as directed
 - Width, Local Trail.....8-feet
 - Pavement Section, Local Trail.....2.25-inch Bituminous; 8-inch minimum Class 5

- **Berm Construction in Boulevard**
 - Maximum Side Slope3:1
 - Maximum Side Slope with Natural Vegetation.....2:1

SANITARY SEWER

- **Force Main**
 - Material.....PVC or HDPE
 - PVC, 2-inch–24-inch..... C900/C905
 - HDPE Class, 1-inch.....SDR 9
 - HDPE Class, 2-inch–24-inch.....SDR 11
 - Minimum Cover.....7½-Feet
 - Location of main in Street.....Project Specific
 - Tracer Wire.....Copperhead #12 High Strength part #1230G-HS
 - Air Relief Valve and Manhole Locations.....All High Points

- **Gravity main**
 - Material.....PVC
 - Minimum Diameter.....8-inch
 - Class, up to 20-feet in depth.....SDR 35
 - Class, 20-25 feet in depth.....SDR 26
 - Class and Material, over 25 feet in depth.....Project Specific
 - Minimum cover over pipe.....5.5-feet
 - Maximum depth of pipe.....30-feet
 - Location of main in Street.....Centerline
 - Slope.....Ten States Standards
 - Tracer Wire.....Copperhead #12 High Strength part #1230G-HS

- **Sanitary Sewer Manholes**
 - Type.....Precast Concrete
 - Maximum inlet/outlet elevation difference.....2-feet
 - Minimum depth of Manhole.....6-feet
 - Type of Casting.....R-1642-B (see detail No. 107)
 - Joints and Assembly.....Per City Details
 - Location.....Street Centerline
 - Maximum Spacing.....400-feet
 - Flow Line Match Required.....8/10ths Rule
 - Drop Across All Manholes Required.....0.1-feet
 - Connections to Existing Manholes.....Core Drill with Boot
 - Outside drop minimum.....2-feet
 - Outside drop Material.....Ductile Iron

- **Service Pipe**
 - Material.....PVC
 - Minimum Diameter.....4-inch
 - Class.....Schedule 40
 - Location.....Downstream of water service

WATERMAIN

- **City Water System Adequate Service Pressure Zone (2-story residential, 50 psi static)**
 - First Floor Elevation (FFE) below 1,021.....Adequate
 - FFE at 1,021 up to 1,030.....Booster Pump
 - FFE at 1,030 or above.....Eng. Analysis
- **Main Pipe**
 - Material.....PVC
 - Class.....C900, DR-18
 - Minimum Diameter – Mainline.....8-inch
 - Minimum Diameter – Residential Hydrant Lead.....6-inch
 - Minimum Diameter – Commercial/Industrial Hydrant Lead.....8-inch
 - Minimum Cover.....7½-feet
 - Location of main in Street.....North or West
 - Tracer Wire.....Copperhead #12 High Strength part #1230B-HS
 - Maximum Length of Dead Ends.....600-feet
 - Air Release measures.....MH, Hydrant
 - Temporary Dead End Lines.....Hydrant/Bleed Valve Required
- **Hydrants**
 - Type.....Waterous Pacer WB-67
 - Depth of Bury.....8½-feet
 - Spacing Radius from Building.....250-feet
 - Gate valve on Hydrant leads.....Yes
- **Valves**
 - Resilient Seat Gate Valve, for 12-inch pipe & smaller.....American Flow Control 2500 Series
 - Butterfly Valve, for pipe over 12-inch.....Mueller Linesal III
 - Valve Box.....Tyler G-Box6860
 - Maximum area isolated by valving.....20 services
 - Maximum distance between valves on Trunk Mains.....800-feet
- **Service Pipe**
 - Service Material.....SIDR 7 IPS PE
 - Corporation Stop.....A.Y. McDonald 74701B
 - Curb StopA.Y. McDonald 76104
 - Curb BoxA.Y. McDonald 75614 w/rod & Mpls. Top
 - Tracer Wire.....Copperhead #12 High Strength part #1230B-HS

STORM SEWER

- **Design**
 - Design Frequency for Storm Sewer.....10-year
 - Minimum storm sewer design velocity.....3-fps
 - Maximum storm sewer design velocity.....15-fps
 - Maximum storm sewer outlet velocity.....5-fps
 - Minimum Outfall Pipe Slope.....verify positive grade at completion (no reverse grade)

- **Main Pipe**
 - Storm Sewer Pipe Material.....RCP
 - Minimum Cover Depth, street.....4-feet
 - Minimum Cover Depth, green areas.....3½-feet
 - Minimum Pipe Diameter, Main.....15-inch
 - Minimum Catch Basin Lead.....12-inch
 - Location of main in Street.....South or East

- **Culvert pipe**
 - Culvert MaterialRCP
 - Minimum Culvert Size.....15-inch
 - Apron and Trash Guard Required.....Yes

- **Manholes**
 - Type.....Precast Concrete
 - Sump Depth and Location..... Prior to stormwater BMP
 - Minimum Structure Depth.....4½-feet
 - Casting.....R-1642-B (see detail no. 107)
 - Minimum Adjustment Rings.....4-inches
 - Maximum Adjustment Rings.....1-foot

- **Catch Basins**
 - Type.....Precast Concrete
 - Minimum Structure Depth.....4½-feet
 - Maximum run to Catch Basin.....350-feet
 - Casting, Curb & Gutter, B Style Curb.....R-3067V
 - Casting, Area Drain.....R-4342

STORMWATER MANAGEMENT AND STORMWATER BMPs

Note: Stormwater facilities shall be in accordance with the Requirements listed herein; in accordance with the Requirements of the Minnehaha Creek Watershed District (MCWD) or Carver County Water Management Organization (CCWMO); and in accordance with the Minnesota Stormwater Manual if not otherwise addressed. When referencing the Minnesota Stormwater Manual, all “Recommended” and “Highly Recommended” provisions shall be considered requirements by the City of Victoria unless specifically approved otherwise by the City Engineer.

- **Site Design**

- Facility location (Including wetlands and buffers).....Outlots deeded to City
- Location.....above 100-year HWL
- Building Lowest Opening above 100-year HWL.....2-foot
- Building Lowest Opening above EOF.....1-foot
- Minimum access road easement width.....20-foot
- Maximum grade for maintenance access roads.....10%
- Setback from building foundations.....35-foot
- HSG D Soil ClassificationSoil Borings Required
- Wetland Buffer Signs.....Installed per MCWD
- Minimum slopes.....3%
- Maximum slopes.....3H:1V
- Sump Structures.....Prior to All Stormwater BMPs

- **Stormwater Ponds (Detention Basins)**

- Design Frequency (DF), SCS Type II.....2, 10, and 100-year
- DF, Landlocked Basins (Requires Volume Control).....Back to Back 100-year
- Minimum Basin Depth to NWL.....4-foot
- Maximum Pond Depth to NWL.....10-foot
- Average Permanent Pool Depth.....4-foot to 6-foot
- Permanent Pool Length-to-Width Ratio.....3:1 or greater
- Maintenance Bench Maximum side slope, first ten feet above Permanent Pool.....10:1
- Aquatic Bench Maximum side slope, first ten feet into Permanent Pool.....10:1
- Maximum side slope, beyond first ten feet.....3:1
- Pretreatment Sediment Forebay.....Required 10% Pond Area
- Required freeboard.....2 feet above HWL

- **Drainage Swales**

- Maximum side slopes on Swales.....3:1
- Maximum side slopes on Right-of-Way Swales.....4:1
- Minimum longitudinal Swale grade.....3%
- Minimum Swale depth within Right-of-Way.....18-inches
- Minimum Bottom Width.....4-foot

- **Infiltration Facilities (Bioretention Areas and Rain Gardens)**

- Inlet control from Streets.....Use Neenah R-3067-V casting on Catch Basin (no curb cuts)
- Maintenance Agreement for public right-of-way.....Required
- Maintenance Access Easement.....Required
- Minimum distance from septic system or drainfield.....35-foot

- Minimum distance from public or private well.....50-feet
- Maximum Site Slope.....5%
- Minimum depth to Bedrock.....3-feet
- Minimum depth to Seasonally High Water Table.....3-feet
- Located in “hotspot” drainage shed (i.e. gas stations).....Prohibited
- Located in Hydrologic Soil Group D Soils.....Prohibited
- Underdrain,6” PVC Schedule 40
- Soil infiltration rates..... *By Field Testing at Facility Location
- Minimum In-situ Permeability.....1-inch per hour
- Maximum side slope.....4:1
- Maximum drain dry time.....48 hours
- Soil medium.....MnDOT 3877 E Rooting Topsoil Borrow
- Plantings.....Seed per MnDOT 3876 Specifications with Type 33-261
.....Seed to be enhanced with 1 plug per 4 Square Feet
.....Infiltration areas 10,000 sqft or greater requires 3 grass mixes for variety
.....Native Shrubs to be planted in conformance with City approved landscape plan

** Soil borings are required to verify infiltration rates. Borings must be taken to a depth of 20 feet below proposed infiltration basin elevation.*

- **Other Stormwater BMPs:** *The City of Victoria has adopted the following additional BMPs and Low Impact Development practices for the City and promotes their use in accordance with these Engineering Design Standards and MCWD or CCWMO Requirements.*
 - **Underground Infiltration Trench.**
 - **Filtration.**
 - Underdrain requirements:
 - 6” PVC SCH40 Pipe with 3/8” perforations with tracer wire
 - 45-degree maximum bends
 - Cleanouts at pipe ends cut 2’ above finished grade with watertight removable caps.
 - connections shall be wye fittings.
 - Lateral spacing less than 25 feet.
 - Underdrain must drain through access structure and outlet through RCP pipe with RCP flared end section.
 - Underdrain bedding: When bed in sand, use circular knit fabric around pipe, otherwise, 3-inches of #57 stone on side and top of pipe.
 - **Vegetated Swales.**
 - **Tree Preservation and Planting.**
 - **Soil Amendments.**
 - **Capture and Reuse of Stormwater.**

DETAIL PLATE NUMBERS AND PLAN NOTES

- Pipe Installation 101,103,105
- Watermain 200A,201,203,204,206,207,208,210
- Sanitary Sewer 300A,301,302,303,305,306,313,314
- Storm Sewer 400A,402,404,405,406,407,408,409,410,
411,412,416, 417,419,420,421,423
- Pavements, Curbs, Walks 500A,501,502,504,505A, 505B, 505C, 505D, 505E,
506,507, 509, 510,511,512,513
- Erosion Control 600A,600B,600C,600D,601,603,604,605
- Miscellaneous 700A,705,712,713
- Typical Sections and Right-of-Way 801,804,805,806
- Landscaping 900A, 901A, 901B, 902A, 902B, 903A, 903B, 904