

**CONSTRUCTION
STANDARDS
SUMMARY**

CITY OF BUFFALO STANDARDS

SUMMARY

SANITARY SEWER

- Provide full depth to plat line or beyond for future. Set manhole at plat line.
- SDR 35 for depths of 20 feet or less. SDR 26 for all depths over 20 feet deep. All service pipe shall be SDR 26.
- Precast manholes with integral base. Manhole shall NOT include steps.
- Casting Neenah® R-1642-B with self-sealing lid, labeled “sanitary sewer” with 2 concealed pickholes 180 degrees apart.
- Avoid green space crossings. Where specifically approved by the City Engineer, green space crossings shall begin and end in roadways unless otherwise approved. Avoid locating manholes in green space.
- Maximum distance between manholes shall be 400 LF unless otherwise approved.
- Services shall be stubbed to 10 LF beyond the R.O.W. line.
- Depth at end of service line shall be a minimum of 11 feet with riser to curb stop elevation.
- Place a 2” x 2” marker with steel rod within 6” of the ground surface at the ends of all services.
- A manhole shall be set at the end of each line. Having a manhole at the end of two lines flowing in opposite directions will not be allowed.
- Tracer wire consisting of #12 AWG solid copper or copper clad steel (CCS) with 30 mil high density polyethylene (HDPE) Green insulating jacket with a minimum 450 lb. tensile break load shall be installed along all services. Connectors shall be DryConn connectors manufactured by King Innovation twist on connectors filled with silicone waterproofing sealant suitable for direct bury applications, or approved equal. A tracer wire access box shall be placed at the end of all services.
- All new sanitary sewer mains shall be jetted, vacuumed, and televised prior to acceptance by the City. City shall be provided with 2 copies of televising DVDs.

WATERMAIN

- Standard material shall be 8” PVC C-900. Larger watermains may be required to meet pressure and flow requirements.
- For horizontal directional drilling applications, standard watermain material shall be HDPE DR 11 DIPS (Ductile Iron Pipe Size) or Fusible PVC C-900.
- Fire Hydrants
 - Waterous® WB 67-250, Traffic Rated, Contemporary Style, Red
 - Grade 316 Stainless Steel Bolts
 - Left (C.C.W.) to Open
 - 1 ½” Pentagon Non-Weathershield Operating Nut
 - Rocker Lug style nozzle caps with chains
 - 2 Hose Connections – 2 ½” NST
 - 1 Pumper Connection – 4 ½” NST
 - 16” break off section
 - 8’6” bury depth typical

- 6" MJ Base Connection
- UL Listed The hydrant lead shall contain a 6" gate valve. Color and threads shall match City of Buffalo Standards. Two (2) Hydrfinder fiberglass red/white hydrant markers manufactured by Radon shall be included, forward extra marker to City Chief Water Operator.
- Watermain shall have 8' of cover, standard.
- Services shall be 1" PE pipe conforming to Grade PE-3408 or PE-4710 rated for 200 PSI working pressure, SDR-9. Pipe shall conform to ASTM D-1248 & D-2737 for Copper Tube Size, outside diameter controlled. Connections shall be compression type with type 304 stainless steel stiffeners at all connections.
- No services shall be located within driveways. No curb stops shall be located within any paved areas including driveways or sidewalks.
- Water service appurtenances shall be A.Y. McDonald®
 - Curb Box = 5614TW (Tracer Wire Lid) with 60" stainless steel rod and stainless steel cotter pin
 - Curb Stop = 76104Q
 - Corporation stop = 74701BQ
 - Tapping Saddle = Smith-Blair 372
- Curb stop box shall be set at 9' beyond the R.O.W. line and marked with a steel fence post with a blue painted top.
- For commercial properties requiring a fire suppression service, a separate domestic water service line shall be installed off of the fire suppression line outside of the building. A curb stop shall be installed on the domestic water service line outside of the building and shall be accessible to the City of Buffalo at all times.
- Mega Lugs® and/or stainless steel rods are required for tying watermains.
- Valves shall be set as to provide isolation to each 15-20 lots. When tying into existing main begin with a valve, unless within multi-phased project.
- All nuts and bolts on valves shall be 316 stainless steel.
- Plan for and provide for complete flushing of all new watermain. No dead ends without a hydrant or temporary flushing capabilities.
- Avoid green space crossings. Where specifically approved by the City Engineer, green space crossings shall have valves in roadway at each end. Also plan green space crossings so as to avoid bends or mechanical joints in green space.
- Plan for 400 LF centerline measured spacing on hydrants. Set hydrants on R.O.W. or property lines and at intersections. No hydrant valves shall be placed in sidewalk.
- All valve boxes shall be set so as to provide 6" of elevation adjustment each way.
- Tracer wire consisting of #12 AWG solid copper or copper clad steel (CCS) with 30 mil high density polyethylene (HDPE) Blue insulating jacket with a minimum 450 lb. tensile break load shall be installed along all services and along all mains. Connectors shall be DryConn connectors manufactured by King Innovation twist on connectors filled with silicone waterproofing sealant suitable for direct bury applications, or approved equal. A tracer wire access box shall be placed at the end of all services. Tracer wires shall be brought up at all hydrants and on the outside of all valves.
- Hydrants installed below water table shall have factory plugged drain holes and shall be furnished with a blue pumper nozzle.
- All valve box assemblies shall be furnished with a valve umbrella anchorage assembly as manufactured by Adaptor, Inc., or equivalent.

- All fittings, restrained joint glands, valves and hydrants shall be coated with a 6-8 mil nominal thickness fusion bonded epoxy conforming to the requirements of ANSI/AWWA C550 and C116/A21.16.
- All fittings, valves, valve boxes, hydrants, and water service appurtenances shall be manufactured in the USA
- Two 6 oz. large sacrificial zinc anode caps shall be installed per each gland on every watermain fitting.
- All fittings shall be secured using Core-Blue-T-Bolts.
- All fittings, valves and hydrants shall be fully wrapped, taped and sealed with polyethylene encasement.

FIBER OPTIC

- 2-inch conduit meeting the following requirements shall be installed along all streets behind the curb on both sides of the road. The conduit shall not be placed under sidewalks or trails.
 - Install at 36-inch depth
 - 2" Polyethylene with a minimum wall thickness of 0.218"
 - Orange color throughout the wall thickness
 - Smooth wall interior design
 - Include tracer wire consisting of #8 AWG stranded copper with black THWN insulation on the outside of the conduit and bring to surface in a tracer wire access box at each intersection and every 400 feet
 - Include a pull rope inside the duct consisting of nylon, round or flat tape design, rated for 1500 lb. pulling tension
 - Mark all ends of duct with a locatable marker such as a tracer wire access box or metal post flush with the ground

STORM SEWER

- RCP shall be used under all public roadways.
- HDPE shall be allowed in green space only.
- HDPE aprons will not be accepted. Galvanized metal or approved equal only.
- Storm sewer manhole castings shall be R-1733B-5001, labeled "Storm Sewer" with 2 concealed pickholes.
- Catch basin castings in roadway shall be bicycle safe. Curb inlet castings shall be R-3067V.
- Field catch basin casting shall be Neenah R-4342 or R-2561 castings.
- Riprap material shall be Granite.

STORM DRAINAGE PLAN

- A storm water management plan shall be submitted showing that all of the following requirements have been met.
- Hydraulic calculations shall be based on a 10-year storm event using Atlas 14 rainfall intensities.
- Storm ponds shall be labeled with the bottom, NWL, HWL = 100 year and overflow elevations.
- Public storm ponds should be contained within outlots dedicated to the City of Buffalo

- All storm sewer lines located outside of the road ROW shall be contained within a utility easement a minimum of 20-feet in width.
- Access must be provided to all storm sewer structures, flared end sections, pipes, and ponds. Access to public BMP's may be provided via drainage and utility easements such that gradients do not exceed 8.00%
- Model 2 year, 10 year, 100 year & 10-inch 24 hour rainfall events using Atlas 14 rainfall intensities. All developments shall be designed so that the rate of runoff is less than or equal to pre-development conditions for the 2 year, 10 year and 100 year events. The 10 inch rain event shall be used to show that no flooding of structures will occur during a 10-inch rain event.
- All ponds shall be sized according to MPCA criteria.
- All new developments shall be designed so that there is no net increase from pre-project conditions on an annual average basis for stormwater discharge volume (except where infiltration techniques are prohibited below), Total Suspended Solids (TSS) and Total Phosphorus (TP)
- All redevelopment projects shall be designed so that there is a net reduction from pre-project conditions on an annual average basis for stormwater discharge volume (except where infiltration techniques are prohibited below), Total Suspended Solids (TSS) and Total Phosphorus (TP)
- Infiltration techniques shall be prohibited when the infiltration structural stormwater BMP will receive discharges from, or be constructed in areas:
 - a) Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issued by the Agency
 - b) Where vehicle fueling and maintenance occur
 - c) With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock
 - d) Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater
- Unless a higher engineering review is completed to provide a functioning treatment system and prevent adverse impacts to groundwater, infiltration techniques shall be prohibited when the infiltration structural stormwater BMP will be constructed in areas:
 - a) With predominately Hydrologic Soil Group D (clay) soils
 - b) Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features
 - c) Within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13
 - d) Where soil infiltration rates are more than 8.3 inches per hour
- For projects where site constraints limit the ability to provide the required control practices within the project boundary; the project may provide lesser volume control for that portion that cannot be treated within project boundaries. However, other volume reduction techniques other than infiltration (such as evapotranspiration, reuse/harvesting, conservation design, etc) must be implemented on site to the extent practical as determined by the City Engineer. Such projects may include:
 - a) Linear projects where reasonable effort has been made to obtain sufficient right-of-way to install required control practices and said efforts have been unsuccessful;
 - b) Sites where infiltration is prohibited;

- c) Other locations as determined by the City Engineer or designee.
- Projects that have made reasonable effort but been unable to fully meet TSS and TP requirements within the project limits may upon authorization by the City Engineer utilize the following methods in order of preference to meet that portion not met onsite (mitigation project):
 - a) Provide treatment that yields the same benefits in an offsite location to the same receiving water that receives runoff from the project site. If this is not feasible then;
 - b) Provide treatment that yields the same benefits in an offsite location within the same Minnesota Department of Natural Resources catchment area as the project site. If this is not feasible then;
 - c) Provide treatment that yields the same benefits in an offsite location within an adjacent Minnesota Department of Natural Resources catchment area upstream of the project site. If this is not feasible then;
 - d) Provide treatment that yields the same benefits at a site approved by the City.
- Mitigation projects must involve the creation of new structural stormwater BMPs or the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
- Routine maintenance of structural stormwater BMPs cannot be used to meet mitigation requirements authorized above
- Offsite mitigation authorized above shall be completed within 24-months of the begin of construction on the permitted site.
- Applicants shall provide documentation showing compliance with volume, TP and TSS requirements. Acceptable options shall be:
 - a) For Volume:
 1. Calculations shall be by a methodology listed in the MPCA Stormwater Manual or other method approved by the City Engineer or designee.
 2. For agricultural land subject to this section, the maximum runoff curve number (RCN) used in such calculations shall be 51 for Hydrologic Soil Group (HSG) A, 68 for hydrologic soil group B, 79 for HSG C, and 84 for HSG D.
 3. Heavily disturbed sites will be lowered one permeability class for hydrologic calculations. Lightly disturbed areas require no modification. Where practices have been implemented to restore soil structure to pre-developed conditions, no permeability class modification is required.
 - b) For TSS and TP:
 1. Calculations shall be done using the Minimal Impact Design Standards (MIDS) Calculator available on the MPCA website, or
 2. Other method approved by the City Engineer or designee.
- Where the City Engineer authorizes the construction of private stormwater management facilities, the applicant/developer shall designate the responsible party for inspection and maintenance of all private stormwater management facilities in an agreement to be recorded against the properties being developed. In addition, the agreement shall provide for:
 - a) Description of anticipated maintenance activities and frequency.
 - b) Access in perpetuity for inspection of the facilities by the City Engineer or designee.

- c) Access in perpetuity for maintenance of the facilities should the City Engineer or designee find that stormwater facility maintenance is required and upon written notice the property owners fail to take corrective action with the cost of such maintenance to be paid by the property owner.
- d) If the expense is not paid, the expense will be made a special assessment against the property concerned. The property owner waives any rights to appeal the special assessment.

STREETS

- Street section design shall be for 9-ton on a collector and 7 ton on a local road based on the soils report.
- Through residential streets shall be 38-feet face to face. All other local residential streets shall be 32-feet face-to-face. All streets within commercial areas shall be 38 feet face to face. These widths are subject to the approval of the City Engineer.
- All cul-de-sacs shall have a minimum radius of 50 feet to face of curb.
- Crown of streets shall be a minimum of 2.5%.
- Wear course shall be placed after 1 freeze-thaw cycle.
- Standard curb shall be B618.
- Boulevards shall be graded to 2.00%.
- Islands in cul-de-sacs shall not be permitted.
- Sidewalks shall be located along one side of all streets; cul-de-sacs may be excluded if approved by the City Engineer. Sidewalks shall be 5" thick concrete and 5' wide with a 5' set back from the back of curb.
- Bike paths shall be 10' wide and set back 6' minimum from the back of curb.
- All manholes and gate valves covered by the base course shall be brought to grade immediately after the base course is placed. They shall be raised again just prior to the final lift of bituminous being placed.
- A Street Signage plan shall be included with all plans.
- All traffic signs including street name signs shall be installed by the developer in accordance with the city standards.
- Provide 100' of profile for existing streets proposed for extension.
- Roll tests shall be conducted on prepared subgrade prior to placing Select Granular Borrow and on prepared Class 5 aggregate base prior to paving bituminous base.
- Traffic control shall satisfy MN MUTCD Standards.
- 4" PVC perforated drain tile without geotextile sock shall be required in the subgrade under the back of curb on all streets. Granular material required for backfill shall conform to the requirements of MnDOT 3149H course filter aggregate.

GRADING AND EROSION CONTROL

- Low openings shall be at a minimum of 3' above the E.O.F and the 100 year H.W.L. of adjacent ponds and wetlands.
- Low floor elevations for homes shall be 3' above the ordinary high water level or the highest known water level whichever is greater of all adjacent ponds and wetlands.

- Any wetland mitigation required for the project must be permitted prior to final plan approval and plans for on-site mitigation must be contained in the submitted project plans and specifications.
- Erosion control shall be in place prior to the start of any work.
- Provide at least two bench marks for each project.
- Provide a SWPPP for each project meeting all requirements in the MPCA NPDES Construction Stormwater Permit. The SWPPP, including but not limited to the site plan portion of the SWPPP, must be kept up to date by the developer throughout the project. The site plans shall incorporate the following erosion and sediment controls and waste controls as described in the MPCA NPDES Construction Stormwater Permit for Construction Activity No. MN R100001:
 - a) BMPs to minimize erosion
 - b) BMPs to minimize the discharge of sediment and other pollutants
 - c) BMPs for dewatering activities
 - d) Site inspections and records of rainfall events
 - e) BMP maintenance
 - f) Management of solid and hazardous wastes on each project site
 - g) Final stabilization upon the completion of construction activity, including the use of perennial vegetative cover on all exposed soils or other equivalent means
 - h) Criteria for the use of temporary sediment basins
- Construct storm ponds or temporary ponds early in grading. Install erosion control blanket or bonded fiber matrix hydro-seeding from the NWL to the top of pond and along any channelized inflow or overflow routes. After ponds have been completed, seed with a temporary seed mix or native seed mix in the case of permanent ponds.
- The minimum overland drainage grade, including back yard swales, shall be 2.00%.
- All slopes 3:1 or steeper shall be seeded and covered with appropriate erosion control blanket.
- Emergency overflows shall be clearly noted on grading plan sheets and street utility plans. All EOF's shall be seeded, blanketed and protected with construction or silt fence so as to protect the finished grade during the home building process.
- Wetlands to be preserved shall be encircled with silt fence, prior to the start on any work.
- All wetlands shall have a vegetation buffer equal to the building setback as required by the zoning district and yard area in which the wetland is located, however, in no case shall the buffer zone be reduced to a distance of less than twenty (20) feet.
- Place 4' of sod behind back of curb after small utilities and sidewalk installation is complete.
- Rock entrance shall be installed for all new home construction sites.
- All erosion control shall be completed in accordance with the Minnesota Pollution Control Best Management Practices.
- All silt fence and erosion control shall be removed by the Developer after vegetation has been established and home construction is completed in that area.

OTHER

- Portable Biffs are required at all home construction sites. Each individual home construction site shall have a biff for use by construction workers.

PROJECT FINALIZATION

- The City of Buffalo Standard Punch List form must be completed.

- Record drawings shall be submitted in both digital and reproducible formats.
- The City of Buffalo Project Final Request form must be completed and submitted.
- A two year maintenance bond is required from the date of final project acceptance by the City. The maintenance bond shall be submitted to the City of Buffalo prior to the letter of credit being released.

RECORD DRAWINGS

- A Record Grading Plan shall be submitted by the Developer and include the following:
 - Location and finished grade elevations along all swales, berms, and ditches.
 - Location and finished grade elevations for all pond cross sections and emergency overflow locations.
 - City Project Number
- A Record Street and Utility Plan shall be submitted by the Developer and include the following:
 - As built elevations of all sanitary and storm sewer manhole and catch basin rims and inverts and flared end sections.
 - As built elevations, grades and locations of all utility lines.
 - Detailed location sketches of any services not installed exactly per the plan.
 - Benchmark elevations within the development.
 - Contractor's Name and Construction Completion Date.
 - City Project Number
- Upon completion of the improvements, the Developer shall promptly deliver to the City Engineer a PDF of draft Record Drawings for review. Upon review and after any required changes have been made, the Developer shall deliver the following to the City Engineer:
 - One electronic copy of all plan sheets in a PDF format and one electronic copy of the AutoCAD base drawing in a .dwg format. The base drawing shall include property lines, easement lines, all proposed utility lines, street names, and other information that may be required by the City Engineer.

OTHER APPLICABLE CITY CODES

- CHAPTER 7, Sections 7.06, 7.07, 7.08 and 7.20.
- CHAPTER 11.
- CHAPTER 12.
- You can find the City Code Online at <http://ci.buffalo.mn.us>.

*Note: Trademarked materials may be replaced by an approved equal, approved by the City of Buffalo Engineer.