



ENGINEERING DESIGN MANUAL

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ENGINEERING DESIGN MANUAL

PART 1. INTRODUCTION

This manual presents standards to be incorporated into the designs, plans and specifications for new subdivision and public infrastructure in easements on private property construction within the City of Empire. These standards will promote high-quality projects and uniform systems throughout the City. High quality and uniformity will maximize infrastructure safety, function and reliability and minimize long term costs for Empire taxpayers.

This manual also provides sections related to procedures for conducting projects and design rules.

The Engineering Department recommends this manual be annually reviewed and updated as changing regulations, construction and maintenance experiences, and technology warrant.

PART 2. APPLICABILITY

The City of Empire Engineering Design Manual is intended to supplement City Code, especially the Subdivision and Zoning Ordinances. If any conflicts between the Engineering Design Manual and the City Code are identified, the City Code will govern.

PART 3. ROLES DEFINED

Where the term “City” appears in this or referenced documents, it refers to the City of Empire or its representative, including the City Engineer. “Developer” means the entity named in the Development Contract for the project or its representative. Where the term “Owner” appears in referenced documents, it refers to the Developer or its representative.

City codes require Developers of property within the City to submit certain documents and drawings for review and approval by the City. These include, but are not limited to, items such as grading plans, drainage plans and computations, topographic surveys, plats, and construction plans and technical specifications for all public utilities and streets. The Developer may not have the credentials required by law to prepare the required submittals, so they typically hire an engineering firm for this service. “Developer’s Engineer” in this document refers to a civil engineer licensed in the State of Minnesota and responsible for the plans and specifications for the project. It may also include other professionals appropriately licensed for the portions of the project they are responsible for. These professionals may be land surveyors, landscape architects, architects, or planners.

The Developer’s Engineer is solely responsible for providing a quality design that meets all applicable laws and conforms to industry practice. These rules are meant to provide guidance and consistency within the City, but not replace sound engineering judgment and industry practice. Consult with the City Engineer on matters related to the design where there is a difference of opinion or clarification is needed.

PART 4. IMPROVEMENT PROCUREMENT

Two methods are available to finance and develop subdivision projects in the City.

- A. Privately Financed Improvement – The most common procurement method requires the Developer to finance and construct the public improvements with City oversight. The remainder of this document is focused on projects to be financed and constructed solely by the Developer.

- B. Publicly Financed Improvement – The City does not normally construct public improvements within private developments. A Developer may sign a petition to the City to request they approve the work to be completed as a Public Improvement project, where the City funds and constructs the “Public Improvements” (commonly streets, drainage, and utilities) and assesses the benefiting properties. Only work eligible under State Statutes can be financed under this method. The developer must waive their right to all hearings and request that the entire cost of all engineering, planning, legal, or other required work be assessed against their developing property. The developer is required to fund an escrow for engineering costs before the City begins any work. If the developer prefers, they could alternatively pay directly for the work instead of having the costs assessed against their developing property.

PART 5. DEVELOPER FINANCED IMPROVEMENTS

5.01 Grading.

- A. The Developer may be issued a grading permit based on the Preliminary Plat subject to requirements in the Zoning and Subdivision Ordinances.
1. The Developer must submit plans, specifications, and other documents to the City for the purpose of obtaining a grading permit as required by the Subdivision Ordinance. These plans and specifications must be in accordance with City rules and standards outlined herein. The City’s comprehensive plans for sanitary sewer, water, storm drainage and roadways must be reflected in the design.
 2. The City does not check grading elevations in the field during mass grading work. The Developer must submit an as-built survey demonstrating that mass site grading was performed in accordance with the final grading plan for release of security associated with grading and before building permits can be approved. The survey may; however, be submitted as soon as grading is substantially complete. This may avoid contractor remobilization and additional restoration costs. The information provided must include 1-foot contours and spot elevations at every lot corner and building pad as well as spot elevations at the bottom of rear yard drainage swales where they cross lot lines and at side-yard swale high points.

5.02 Streets and Utilities.

- A. Following final plat approval, the developer may begin work on streets and utilities.
1. All plans must be reviewed and approved by the City Engineer prior to beginning work. The City Engineer will issue a Notice to Proceed letter allowing the right to begin construction.
 2. All necessary permits must be obtained by the Developer and copies provided to the City Engineer prior to commencing any utility and street work. The City will issue written notification to proceed when all approvals have been obtained.
 3. The Developer must furnish to the City a list of contractors and sub-contractors being considered for retention by the Developer for any of the public improvement work required in the project. The City may reject any contractor based on past performance or lack of applicable experience, equipment, or available personnel.
 4. The Developer is responsible to bid/negotiate the construction contract, including the

methods of measurement and payment for all items of work. The contract price must be broken down into four categories: 1) streets, 2) sanitary sewer, 3) water, 4) storm water facilities, and 5) any other ancillary improvements (sidewalks, trails, retaining walls, turf restoration, etc.).

5. Any deviations from the approved plans and specifications during construction deemed minor by the City Engineer must be approved by the City Engineer in writing before they are made. Major revisions will require an amendment to the preliminary and/or final plat and the Development Agreement approved by the City. The amendments may require both Planning Commission and City Council review and approval.
6. The Developer's Engineer must provide staking in accordance with City requirements. The City will review staking calculations, control, or stakes at the Developer's expense, as deemed necessary.
7. The City of Empire delegates MPCA General Stormwater for Construction Permit Construction Site Inspection responsibilities to developers for developer-financed improvement projects by default, unless the developer requests the City and the City agrees to provide these inspections at the developer's cost.
 - a. The Developer must provide a certified inspector to perform inspections in accordance with the MPCA General Stormwater Permit for the project. The inspector must be listed on the Storm Water Pollution Prevention Plan (SWPPP) document in the plans. In addition to the required inspection and documentation responsibilities in the SWPPP, the inspector must provide the resulting reports to the Engineering Department on a weekly basis, if the inspections are required by the permit. Copies of the reports shall be submitted in electronic format.
 - b. The developer will be notified of missing or incomplete reports or discrepancies between reports and field conditions noted by the City Engineer and will have one week after notification, or as required by permit, to bring reporting up to date and reconciled with any corrected field conditions. Failure to correct within the timeframe may result in the City not allowing subsequent items of work to proceed, withholding of project securities pending corrections, and/or work stoppage in accordance with the Development Contract.
8. It shall be the policy of the City of Empire to perform construction site erosion and sediment control inspections as required by its current Municipal Separate Storm Sewer (MS4) permit separately from and in addition to the Developer's General Stormwater Permit inspections for any developer-led improvement. These MS4 inspections will be performed by the Engineering Department and will be billed to the developer according to the Development Agreement.
9. The MS4 inspections will, at a minimum, include a review of submitted Construction Stormwater Permit inspection reports for construction sites from the site's inspector as well as examining sample inspection locations in the reports and comparing the documentation to actual field conditions. MS4 inspections will be documented and communicated to affected individuals, if necessary.
10. To ensure inspectors are appropriately trained and to facilitate training documentation,

the inspectors will be certified under the University of Minnesota Erosion and Sediment Control Training program and hold a current certification for SWPPP Design or SWPPP Inspection at the time of any inspection.

11. The City Engineer will provide observation of public improvement work for conformance with the approved plans and specifications or standard industry practice. The City Engineer must be notified 48-hours in advance of all work so representatives can be present and coordinate all required construction materials testing. City observation in no way lessens the responsibility of the Developer to provide supervision of Contractors or other oversight to protect their interests. City observers have no authority to relieve the Developer or Contractor from the duty to comply with the plans, specifications, and City Code.
12. All sanitary sewer and watermain testing must be completed and copies of service ties submitted to the City Engineer prior to issuance of any service connection permits.
13. Upon completion of all work through substantial completion, the City Engineer, a representative of the Developer's Contractor and the Developer's Engineer will complete a walkthrough inspection. This includes a final inspection of all site grading. City Engineer approval of the work is required before any release of security. Acceptance of said work shall be made by Resolution of the City Council upon the recommendation of the City Engineer.

5.03 Improvements on Private Property.

- A. If private drives or utilities are included in a development, the following rules apply:
 1. Design layout, section, and materials to meet International Fire Code requirements.
 2. Be aware that the City's Right of Way Ordinance ~~would~~ will apply when public utilities in easements are located under private streets and driveways. The Owner of the street or driveway would be liable for repair/restoration costs if work is required on the utility.
 3. A minimum twenty-foot-wide utility and drainage easement (ten feet on each side of the utility) will be required for any public utilities that are not constructed within the public street right-of-way. Widths will increase as necessary for deeper installations.
 4. Private utility installation requires a sewer/water permit from the City and will be required to meet all applicable City Standards as determined by the City Engineer and/or Building Official.
 5. The entrance to each private drive must include design features that clearly differentiate it from a public street such as a concrete apron or different paving material.

PART 6. ENGINEERING DESIGN STANDARDS AND GUIDELINES

A summary of acceptable products and minimum design requirements for proposed City infrastructure. This list is not all inclusive and shall be used as a design guide. Exceptions to these design standards will be allowed only upon City Engineer approval. To expedite City Plan reviews, exceptions shall be clearly identified in writing with the Plan submittal.

ENGINEERING DESIGN STANDARDS

Note: *Throughout these design standards, the minimum and maximum design parameters identify the end range of the acceptable design in the as-built condition and therefore must account for construction tolerances. Minimum and maximum design parameters are intended for use in the unique and extreme circumstance and therefore should have limited use in the base design.*

STREET DESIGN AND GEOMETRICS

Note: *Turn lane and/or intersection warrant analyses will be required for all new developments to determine if existing or proposed intersections warrant further improvements. Access locations must be in conformance with access spacing requirements for the roadway authority.*

- **Secondary Access Street is Required**

- One-or-two family residential developmentsGreater than 30 Dwelling units
- Multi-family residential developmentsGreater than 100 Dwelling units
- Commercial/Industrial/Institutional developments
(non-sprinkled)Greater than 62,000 SF
- Commercial/Industrial/Institutional developments
(sprinkled)Greater than 124,000 SF
- Commercial/Industrial/Institutional developmentsGreater than 3 stories or 30 feet

- **Minimum Street Widths, Measured from Face of Curb to Face of Curb (F-F)**

- New Local Residential Streets (*with parking on both sides*)32-feet F-F
- Local Residential Street (*when parking is allowed on one-side*)28-feet F-F
- Local Residential Street with no parking26-feet F-F
- Local Residential Street, one-way lanes with center median19-feet F-F
- Collector and Neighborhood CollectorDetermined by City

- **Geometric Design, Local Residential Street**

- Center Crown2.5%
- Minimum Longitudinal Grade.....0.5%
- Maximum Longitudinal Grade5%
- Maximum Intersection Approach Grade,
First 50-feet from curb line2.5%
- Minimum Vertical Curve Length, Crest
(including stop conditions).....MnDOT State Aid design standards
- Minimum Vertical Curve Length, Sag
(including stop conditions).....MnDOT State Aid design standards
- Minimum Horizontal Curve RadiusMnDOT State Aid design standards
- Intersection Angles.....90 degrees
- Tangent Length at Intersection from Curb Line,
Local Streets50 feet
- Tangent Length at Intersection from Curb Line,
Higher Class Streets100 feet

- Minimum Intersecting Street Offset, from Centerlines125-feet
- Curb Radius, Minimum Local to Local.....25-feet
- Curb Radius, Minimum Local to Collector.....30-feet
- Minimum Radius of Cul-de-sac47-feet
- Minimum Grade around Cul-de-sac1.0%
- Maximum Cul-de-sac Street Length (lots less than 2.5 acres)600-feet
- Maximum Cul-de-sac Street Length (lots equal or greater than 2.5 acres)1,320-feet
- Temporary Cul-de-sac at plat lineRequired (per Fire Code)

- **Geometric Design, Collector Street** (*below Standards in addition to Local Residential Street*)
 - Design StandardsMnDOT State Aid design standards
 - Maximum Longitudinal Grade5%
 - Intersection Angles90 degrees
 - Tangent Length at Intersection from Curb Line.....100 feet
 - Tangent Minimum between curves50 feet
 - Minimum Vertical Curve Length, Sag and Crest.....MnDOT State Aid design standards
 - Minimum Horizontal Curve RadiusMnDOT State Aid design standards
 - Minimum Intersecting Street Offset, if allowed, from Centerlines.....250-feet
 - Street/Roadway AccessPer City Zoning Ordinance
 - Driveway Access, ResidentialProhibited
 - Driveway Access, CommercialPer City Zoning Ordinance
 - Curb Radius30-feet

● **Pavement Section Design**

Note: Pavement sections below are minimum allowed. Additional pavement section may be required based on Geotechnical Report of the subgrade soils. The City requires the determination of an R-value to be used in calculation the total granular equivalency (GE) of a street’s design requirements.

Place the final pavement surface/lift at least one winter season after the base construction is completed and in conformance with the Development Contract.

- Local Residential Street.....Minimum 7-Ton Design
- Subbase, Select Granular Embankment (SPEC 3149.2B)Minimum 12-inches
- Subsurface Drainage System.....Required
- Base, Aggregate Base, Class 5 (recycled concrete is prohibited)(SPEC 3138).....Minimum 8-inches
- Non-Wearing Course Mixture, MnDOT 2360

- Type SP 12.5, SPNWB330C.....2.5-inches
- Wearing Course Mixture, MnDOT 2360
 - Type SP 9.5, SPWEA340C1.5-inches
- Collector Street and AboveMinimum 10-Ton Design
- Subbase, Select Granular Embankment (SPEC 3149.2B)Minimum 18-inches
- Subsurface Drainage System.....Required
- Base, Aggregate Base, Class 5 (recycled concrete is prohibited) (SPEC 3138).....Minimum 8-inches
- Non-Wearing Course Mixture, MnDOT 2360
 - Type SP 12.5, SPNWB330C.....2.5-inches
 - Wearing Course Mixture, MnDOT 2360
 - Type SP 9.5, SPWEA340C1.5-inches

- **Drainile/Street Subsurface Drainage**

Design the maximum backyard swale length at 300 feet or four residential lots, whichever is shorter. Use storm sewer and inlets as necessary to meet this requirement. The City Engineer may require drain tile in other swales or low areas if surface drainage feasibility is questionable. Inlets placed at lot corners are prohibited due to interference with future private fencing and property irons.

- Type.....Sch. 40 Rigid PVC, SDR 26, or TP Perforated (not to be used under road section)
- SizeMinimum 4-inch
- Location.....All Low Points in both directions; at 350 foot intervals, drainile stub to each property for future private connections from street or backyard lines, and Project Specific Design
- Length.....Minimum 100-foot runs; 100 feet in both directions from low points
- Clean OutsEvery 300 feet, at all dead ends, and at the right-of-way or easement line for private drainile stubs

- **Curb and Gutter**

- Material, All Purposes.....Concrete
- Strength, Minimum RequirementsMnDOT Spec
- Type: New Developments, Single Family ResidentialModified Surmountable (See City Standard Detail)
- Type: Multifamily, Commercial, Collector Roads, Medians, ReconstructionB618
- Minimum Grade0.5%
- Place “W” and “S” stamps on the concrete curb and gutter over utility service locationsYes

- **Utility Conduit**

- Type.....PVC Schedule 40
- Location/Depth.....Perpendicular to Street and minimum 1-foot below Street Subgrade

- **Entrances/Driveways**

- Maximum Driveway Width at Right-of-wayVaries by Zoning District
- Residential Bituminous Driveway Minimum Thickness,
Section3-inches bituminous 6-inches
class 5 aggregate base
- Commercial Bituminous Driveway Minimum Thickness,
SectionMatch Street
- Residential Concrete Driveway Minimum Thickness.....6-inches concrete 6-inches
class 5 aggregate base
- Commercial Concrete Driveway Minimum Thickness.....8-inches concrete 6-inches
class 5 aggregate base
- Proposed driveway locations/widths shown on the plansRequired
- Commercial driveways maximum grade.....8%
- Residential driveways maximum grade10%
- Residential driveways maximum grade change15%

- **Signing**

- Design StandardsMMUTCD
- Sheathing Type.....Type IX Diamond Grade (DG3)
- Sign PostsU-Channel Steel Post
- Retroreflective Barricades with “Future Thru
Street” Sign.....Required at all temporary dead-ends

RIGHT-OF-WAY AND BOULEVARD LAYOUT

- **Minimum Right-of-way Widths**

For County and State roads, the minimum right-of-way widths for each functional roadway classification shall conform to the respective agency’s standards.

- Arterial.....Determined by City
(120 feet minimum)
- Collector Street.....80 feet to 120 feet
- Commercial, Industrial, High-Density Residential Street.....80 feet to 100 feet
- Local Multi-Family, Single-Family, Twin home Residential Street...66-feet
- Cul-de-Sac66 feet; turn-around
radius of 66 feet

- **Boulevard, Local Residential Street**

Provide a Lighting Plan with street lights in coordination with the Electric Service Provider’s lease program at the following locations: where any street intersects another and favoring the quadrant where most ped crossings are expected to occur; any mid-block pedestrian crossings; points of special interest such as a park or trail entrance, transit stop, or similar feature; lights subject to a maximum spacing of 600 feet. The developer shall pay the full amount of the capital costs for the installation of street lights, where applicable, including poles, underground wire, fixtures, and any equipment to make the lighting system operational.

Street lights to be cobra-head style on 30 foot fiberglass black direct-bury poles with LED

luminaires.

Decorative lighting desired by the Developer would be above and beyond the minimum lighting described above and installation, operation, and maintenance would not be paid by the City, unless otherwise agreed upon.

- Slope, Typical and Maximum.....4% and 4:1
- Topsoil Minimum6-inch
- Turf Treatment (ROW).....Lawn Sod
- Turf (Private)Lawn Sod or Approved Seed Mixture
- Tree Location within ROWNot Allowed
- Tree Locations required per ordinance ...Beyond ROW per approved Landscape Plan
- Street Light LocationPer approved street lighting plan meeting clear zone requirements
- Street Light FixtureTraditional Colonial LED, Type B 4000 Lumens (Black) or approved comparable
- Street Light Pole15-foot Washington Fluted Aluminum (Black) or approved comparable
- Hydrant Location5-feet back of curb
- Hydrant Location (with walk/trail constraints).....mid-boulevard (ensure clear zone is maintained)

- **Sidewalks**

Note: *All sidewalks shall be designed 1-foot inside the ROW line, unless otherwise approved by the City Engineer.*

- Collector StreetRequired on both sides
- Local Residential StreetMinimum of one side
- Cul-de-sac Street.....Required for trail connection
- Width (when on one side of the street or where necessitated directly at back of curb)6-feet
- Width (when on both sides of the street)5-feet
- Sidewalk Maximum Longitudinal Grade.....ADA Requirements
- Pavement Section (non-driveway or pedestrian ramp).....4-inch Concrete; 4-inch Class 5
- Pavement Section (pedestrian ramp)6-inch Concrete; 4-inch Class 5
- Pavement Section (through driveway).....Match Driveway Section
- Boulevard (back of curb to sidewalk) minimum .6-feet

- **Trails**

- DesignMnDOT Bikeway Design Guide for Shared Use Paths
- Locations.....Per City trail plan and as directed
- Width, Local Trail.....10-feet
- Pavement Section, Local Trail.....3-inches bituminous
.....6-inches minimum Class 5 aggregate base
- Maximum Longitudinal GradeADA Requirements

- **Retaining Walls**

Retaining walls, fences, or railings shall not be located in right of ways or easements without approval from the City Engineer.

Plans for retaining walls exceeding four feet in height must be designed and signed by a structural engineer licensed in accordance with Minnesota State Law. Place a chain link or decorative barrier fence a minimum of four feet high at the top of walls exceeding 30 inches of drop when within 5 feet of a public area (path, trail, or street) or at all locations exceeding 48 inches of drop.

Retaining walls across multiple lots must be designed so that a wall on any one lot can be repaired or replaced without requiring dismantling of walls on adjacent property. This may require side by side returns into the slope at the property lines or other means to avoid interdependent walls. This requirement may be waived in cases where the wall will be owned and maintained by a Homeowner's Association.

* See Detail for wall materials and construction requirements. Use big block retaining wall blocks with a limestone color finish. Fences required on top of all retaining walls to meet building code requirements.

SANITARY SEWER

- **Force Main**

- Material.....PVC or HDPE or DIP (if approved by the City Engineer)
- PVC, 2-inch–24-inchC900/C905
- HDPE Class, 1-inchSDR 9
- HDPE Class, 2-inch–24-inchSDR 11
- Minimum Cover.....7.5-Feet
- Location of main in Street.....Project Specific
- Tracer WirePer MRWA Specifications
- Air Relief Valve and Manhole LocationsAll High Points
- Clean Outs.....Low Points

- **Gravity Main**

Extend a sanitary sewer stub to the parcel boundary when future extensions are anticipated.

- MaterialPVC
- Minimum Diameter8-inch
- Class, up to 16-feet in depth.....SDR 35
- Class, 16-25 feet in depth.....SDR 26
- Class and Material, over 25 feet in depth.....C900 DR14
- Minimum cover over pipe10.5-feet
- Maximum depth of pipe30-feet
- Slope.....Ten States Standards
- Tracer Wire.....Per MRWA Specifications
- Location of main in Street.....Centerline

- **Sanitary Sewer Manholes**

- Type.....Precast Concrete
- Maximum inlet/outlet elevation difference without an outside drop ..2-feet
- Minimum depth of Manhole.....10-feet
- Type of CastingR-1642-B
- Chimney Seals.....External Required
- Joints and Assembly.....Per City Details
- Location.....Street Centerline
- Maximum Spacing400-feet
- Flow Line Match Required.....8/10ths Rule
- Drop Across All Manholes Required0.1-feet
- Connections to Existing Manholes.....Core Drill with Boot
- Outside drop minimum (no inside drops allowed).....2-feet
- Outside drop Material.....Ductile Iron
- Incoming pipe to drop MH.....10-ft Ductile Iron

- **Service Pipe**

Sanitary sewer services and cleanouts shall be designed to not be within driveways or other pavements. Show the service locations on the plans relative to proposed driveways to verify. If deemed infeasible, all sanitary sewer cleanouts constructed in paved areas will require the installation of a metal Neenah R1914B or Ford A-1 casting.

The end of all utility services should be marked with a metal fence post. Do not place sewer services directly into dead-ends or manholes.

- Material and ClassPVC Schedule 40 or SDR 26
- Minimum Diameter4-inch
- Tracer Wire.....Per MRWA Specifications
- Drive-In Magnesium Grounding Anode Rod.....Per MRWA Specifications
- Tracer Wire at Grade Access Box (required at ROW of each service line at a minimum)Per MRWA Specifications

- **Easements**

- Sanitary sewer pipe and structures require minimum 30-foot easements centered over the pipe/structure if not located within the public right-of-way. Additional easement width may be required as determined by the City Engineer and Public Works Director. Easements must be dedicated to the City and be provided in the City's standard form of easement agreement.

WATERMAIN

- **Water Service Pressures**

- Individual Booster Pumps required..... development specific

If Individual Booster Pumps are required on a development, the property owner will be the ultimate owner of the booster pump and be responsible for maintenance and replacement. At no time will the City pay for the installation or maintenance of a booster pump.

- **Main Pipe**

- MaterialPVC or DIP (if approved by City Engineer)
- ClassC900 or CL. 52
- Minimum Diameter – Mainline.....8-inch PVC
- Minimum Diameter – Hydrant Lead6-inch DIP
- Minimum Cover7½-feet
- Maximum Length of Dead Ends1,000-feet
- Air Release measuresMH, Hydrant
- Tracer Wire.....Per MRWA Specifications
- Tracer Wire Hydrant Terminal
(required at all hydrants)Per MRWA Specifications
- Location of main in Street.....North or West

- **Hydrants**

- Type.....Waterous Pacer WB-67
- Depth of Bury8.0-feet
- Maximum Coverage Spacing, Residential450-feet (225-foot radius)
- Maximum Coverage Spacing, Commercial300-feet
- Gate valve on Hydrant leadsRequired
- Hydrant Nozzle.....5-inch Storz with Pentagon Nut end cap
- Temporary dead-end linesHydrant required (no air bleed valves)
- Hydrant Marker5-foot EZ See Fiberglass Hydrant Marker
Red/White
- Location of Hydrant5-ft behind back of curb with valve 2-ft
behind back of curb (verify 2-ft clear from
adjacent pedestrian facilities)
- Potable Water Hydrant ColorRed
- Raw Water Hydrant Color.....Blue

- **Valves**

Gate valves shall not include extension rods in the gate valve boxes.

Extend a watermain stub to the parcel boundary when future extensions are anticipated. Place a valve and hydrant at the end of the stub.

- Resilient Seat Gate Valve, for 12-inch pipe & smallerAmerican Flow Control 2500
Series
- Butterfly Valve, for pipe over 12-inchMueller Linesal III
- Valve Box.....Tyler G-Box6860
- Maximum area isolated by valving20 services
- Maximum distance between valves on Trunk Mains800-feet
- Valves required at all intersections; LocationAt Curb PC/PT

- **Service Pipe**

Couplings are not allowed between the watermain and curb stop.

Water services and curb stops shall be designed to not be within driveways or other pavements. Show the service locations on the plans relative to proposed driveways to verify. If deemed infeasible, all curb stops constructed in paved areas will require the installation of a metal Neenah R1914B or Ford A-1 casting. A casting that combines the tracer wire locate box and curb stop into one feature may be required by the City Engineer.

Fittings shall be mechanical joint ductile iron in accordance with AWWA C110. All fittings shall be designed for not less than 250 psi working pressure and shall have a standard thickness cement mortar lining conforming to AWWA C104. Rubber gaskets for mechanical joints shall conform to AWWA C111. All joints shall be installed with an electrical contact through every joint. The manufacturer of all watermain fittings, including valve boxes, shall be approved by the City Engineer.

- Service MaterialHigh Density Polyethylene DR-9 Copper
Tube Size (CTS) or Type “K” copper (if
approved by City Engineer)
- Minimum Service Size1-inch
- Connection TypeCompression Fittings with Insert Stiffeners
(Copper Pipe shall use Compression Fittings, if approved)
- Corporation StopA.Y. McDonald 74701BQ
- Curb Stop.....A.Y. McDonald 76104Q
- Curb BoxA.Y. McDonald 5614 w/rod & Mpls. Top
- Tracer Wire.....Per MRWA Specifications
- Drive-In Magnesium Grounding Anode Rod..Per MRWA Specifications
- Tracer Wire at Grade Access Box (required
At ROW of each service line at a minimum ..Per MRWA Specifications

- **Easements**

Watermain lines and hydrants require minimum 30-foot easements centered over the pipe if not located within the public right-of-way. Additional easement width may be required as determined by the City Engineer and Public Works Director. Easements must be dedicated to the City and be provided in the City’s standard form of easement agreement.

STORM SEWER

- **Design**

- Design Frequency for Storm Sewer10-year
- Minimum storm sewer design velocity3-fps
- Maximum storm sewer design velocity.....12-fps
- Maximum storm sewer outlet velocity5-fps
- Minimum Outfall Pipe SlopeVerify positive grade at completion (no
reverse grade)
- Maximum catch basin inlet spread.....8-feet from centerline for a 10-year storm

- **Main Pipe**

- Storm Sewer Pipe Material.....RCP
- Minimum Cover Depth in Paved Surfaces.....2.5-feet
- Minimum Cover Depth in Greenspace.....2.5-feet
- Minimum Pipe Diameter, Main.....15-inch
- Location of main in Street.....South or East; opposite watermain

- **Culvert pipe**

- Culvert Material, urban/rural road or crossing public road.....RCP
- Minimum Culvert Size15-inch
- Apron and Trash Guard RequiredAll FES larger than 24” dia.
- RiprapRequired per detail

- **Manholes**

- Type.....Precast Concrete
- Sump Depth and Location4-feet, located at last structure in street prior to discharge point
- Sediment Pretreatment Device (last structure prior to outfall).....SAFL Baffle
- Minimum Structure Depth.....4-feet
- Joints and AssemblyPer City Details
- Casting.....R-1642-B
- Minimum Adjustment Rings2
- Maximum Adjustment Rings1-foot
- Drop Across All Manholes Required0.1-feet

- **Catch Basins**

- Type.....Precast Concrete
- Minimum Structure Depth.....3.5-feet
- Maximum run to Catch Basin350-feet
- Casting, Curb & Gutter, B Style Curb.....R-3067V
- Casting, Curb & Gutter, Surmountable Style Curb.....R-3501-TB
- Casting, Area DrainR-4342
- Drop Across All Catch Basins Required.....0.1-feet

- **Easements**

Storm sewer pipe, structures and flared end sections require minimum 30-foot easements centered over the pipe/structure if not located within the public right-of-way. Additional easement width may be required as determined by the City Engineer and Public Works Director. Easements must be dedicated to the City and be provided in the City’s standard form of easement agreement.

GENERAL

Submit a plan for the routing of construction traffic to the City Engineer for approval. If alternative major streets are available, the use of local City streets is prohibited. Keep City streets that are used for access or egress to the construction site free of dirt and other debris. Maintain adequate control of dust.

Furnish, erect, and maintain signs and barricades as provided in MnDOT 1710 “Traffic Control Devices” under the General Conditions to protect the public. Notify the City Engineer 48 hours prior to the proposed partial blockage or closure of any street or public right-of-way. Close no street or public right-of-way without an Obstruction Permit obtained from the City and issued under the City’s Right of Way Ordinance.

STORMWATER MANAGEMENT AND STORMWATER BMPs

Note: *Stormwater facilities shall be in accordance with the requirements listed herein; in accordance with the requirements of the Vermillion River Watershed JPO; and in accordance with the Minnesota Pollution Control Agency NPDES Construction Storm Water Permit. In addition, all “Recommended” and “Highly Recommended” provisions of the Minnesota Stormwater Manual should be considered requirements by the City of Empire unless specifically approved otherwise by the City Engineer.*

Submit a stormwater management plan detailing the sizing/modeling calculations that led to the associated design plans.

- **Site Design**

- Facility locations: City Owned.....Located in Outlots (to be dedicated to City with Access Easement from Public ROW)
- Facility locations: Privately OwnedLocated in Outlots or Easements (Access Easement and Stormwater Maintenance Agreement is required)
- Location and Sizeabove 100-year HWL
- Building Lowest Floor above 100-year HWL.....2-feet
- Building Lowest Opening above EOF1-foot
- Building Foundation/garage floor minimum elevations1.5-feet above top of curb elevation
- Minimum access road width (easement)20-feet
- Maximum grade for maintenance access roads (easement)10%
- Setback from building foundations35-feet
- Flood ProtectionOverland Emergency Overflows Required
- Landlocked Basins (only if approved by City EngineerDesigned for back-to-back 1-year storm events

- **Stormwater Ponds (Detention Basins)**

- Design Frequency (DF).....2, 10, and 100-year, and

- Minimum Basin Depth to HWL 100-year 10 day snowmelt 3-feet
- Maximum Pond Depth to HWL..... 10-feet
- Average Permanent Pool Depth..... 4-feet to 6-feet
- Permanent Pool Length-to-Width Ratio 4:1 Max.
- 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 10% Pond Area
- Required freeboard..... 2-feet above HWL
- Required freeboard (landlocked basin)..... 3-feet above HWL
- Pond Liner..... Clay liner required in DWSMA

• **Drainage Swales**

- Maximum side slopes on Swales (maximum slopes allowed only when necessary) 3:1
- Maximum side slopes on Right-of-Way Swales 4:1
- Minimum longitudinal Swale grade (side yard)..... 2%
- Minimum longitudinal Swale grade (back yard)..... 3%
- Minimum Swale depth within Right-of-Way..... 18-inches
- Minimum Bottom Width..... 4-feet
- Minimum Swale Overland Flow Length of less than 3% without draitile/storm sewer 300-feet

• **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-feet
- Minimum distance from public or private well..... 50-feet
- 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, Group C Soils (filtration) Required
- Maximum side slope 4:1
- Maximum drain dry time..... 48 hours

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

- Soil medium MnDOT 3877 D Rooting Topsoil Borrow

- SeedingMnDOT 3876 Specifications with Type 33-261
- PlantingsPlanted in conformance with City approved landscape plan
- Soil infiltration ratesBy Field Testing at Facility Location*
 - *Minimum 2 borings per facility up to 5,000 SF. of infiltration area.*
 - *Minimum 3 borings per facility up to 10,000 SF. of infiltration area.*
 - *Additional boring required for every additional 5,000 SF. of infiltration area.*

** Soil borings are required to verify infiltration rates. Borings must be taken to a depth of 5 feet below proposed infiltration basin elevation.*

PART 7. CITY STANDARDS FOR RECORD PLANS (IF PREPARED BY DEVELOPER)

7.01 General.

- A. Draft record plans using CAD. Copy the project plan file and identify it as “Record Plan” in the title block and lower right-hand corner of each sheet.
- B. Provide x,y coordinates of all gate valves, corporation stops, curb stops, hydrants, sanitary service wyes, manholes, catch basins, cleanouts, light poles, etc. using survey-grade GPS equipment or better. The Developer, or the Developer’s contractor shall provide and conduct the shots for all subsurface features during construction operations prior to backfilling. The Developer may request the City Engineer obtain this information at the Developer’s expense. Information Required:
 1. List the name and address of the contractors that performed the work.
 2. Cross out incorrect elevations, distances, etc. on record plans with a single line, leaving the design information legible. Add the as-built information above or below the crossed out design information, making sure the notation clearly indicates the revision.
 3. Provide record plans of all drainage swales and ponding areas. Indicate spot elevations, breaklines, and finished contours at two-foot intervals from the bottom of the pond to a minimum of two feet above the emergency overflow level cited on the plans. Show the normal water elevation, high water elevation, overflow elevation, and the acre-feet of storage for each ponding area, along with the storm sewer outlet on the plans. Clearly identify the required 10:1 bench and the access routes on the record plan if changed.
 4. Provide spot elevations for the corners of all building pads.
 5. Shoot elevations and x,y coordinates of any casing pipe ends and the top nut of all new or relocated/adjusted hydrants on the record plan sheets. Provide top nut of hydrant elevations on the watermain plan sheet.
 6. Revise as-built horizontal dimensions if deviating from proposed locations by more than one foot. Recalculate and show the revised percent of grade.
 7. Record force main locations by tying in all bend locations. Refer to Items 10 and 11.
 8. The City Engineer will create record information for lift stations. Refer to Items 10 and 11.
 9. The size, material and class, and invert elevation of all sanitary sewer services shall be shown on the plans. If risers are installed, the height of each shall be indicated on the plans, also drawn on the profile, along with the height of each riser. Locations of the services will be noted on the plans with an “S & W” preceding the stationing. Stationing must be provided as measured from the nearest downstream sanitary manhole.
 10. Show storm sewer mainlines and laterals on the plan and profile sheets.
 11. Show where geotextile grid, fabric or pipe insulation has been placed and subgrade corrections made on the plan portion of the record plans. Also indicate if any surcharging has been used.

7.02 Submittal of Record Plans.

- A. Prior to submitting the final record plans, submit two 11"x17" paper copies to the City Engineer for review and comments.
- B. Submit a digital copy in a format acceptable to the City Engineer **after** final comments from the City have been addressed.

PART 8. STANDARD TECHNICAL SPECIFICATIONS

The Standard Specifications shall be included in the contract documents for all development projects. The specifications shall be bound with the project manual or project specifications book, and shall not be edited. Project specific requirement sections shall be inserted where specific requirements or changes are needed. Entire sections not pertaining to the specific project shall be excluded.

Applicable Specifications:

8.01 City of Empire Standard Construction Specifications.

Consult the City Engineer for direction while compiling the Improvement's construction specifications.

8.02 City Engineer's Association of Minnesota (CEAM), Construction Standard Specifications.

This information is available at www.ceam.govoffice.com.

8.03 Recommended Standards for Wastewater Facilities – Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (10 State Standards).

8.04 Recommended Standards for Water Works – Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (10 State Standards).

8.05 Minnesota Department of Transportation Standard Specifications for Construction, latest edition.

A copy of this document is not included in this manual. However, the MnDOT "Spec" is widely used and distributed throughout the industry. It is also available for viewing online at www.dot.state.mn.us.

PART 9. PLAN SHEET FORMAT REQUIREMENTS

A summary of minimum requirements for plan sheets developed for each project. The minimum criteria shall be followed for all projects. Failure to follow these requirements may delay the City's Plan review.

This document outlines the required plan format and minimum acceptable plan sheet requirements for each development project within the City of Empire. The minimum requirements shall be met for all projects before approval may be granted by the City Engineer.

Plan submittals will not be considered received until all plan formats have been submitted to the City. All submittals and resubmittals shall include full size plans (11" x 17") and electronic plan files in PDF format.

9.01 General Requirements.

1. Plan sheet size shall be 11" x 17".
2. All Plans shall be submitted in electronic PDF format.
3. All electronic CAD/GIS files, when required, must be accompanied by a "layer description list" that clearly identifies the elements of each layer or level.
4. Use Dakota County's coordinate and datum system. Cross-check elevations with City Benchmarks and report any discrepancies.
5. Place a title block in the lower right corner of each sheet. Label each sheet clearly as to its purpose.
6. Label all parcels properly, with lot and block numbers and plat name, outlots, or a Property Identification Number (PID) in un-platted areas. Show the address of developed parcels on the plan.
7. Clearly label all streets.

9.02 Construction Plans

The following plan sheets shall be bound together in one plan set and distributed to the City in the number and plan size as required.

A. Title Sheet

1. Location Map with Section, Range and Township provided.
2. Sheet Index.
3. Plan Date with all Revision Dates.
4. Preparer's Name and Contact Information.
5. Owner's Name and Contact Information.

B. Legend and Typical Sections

1. Plan Legend for all Applicable Symbols.
2. City of Empire Typical Sections as Applicable to the Project.
3. Additional Typical Sections as Deemed Appropriate by the Design Engineer.

C. Standard Details and Storm Sewer Construction Chart

1. City of Empire Standard Details as Applicable to the Project.
2. Additional Standard Details as Deemed Appropriate by the Design Engineer.
3. Storm Sewer Construction Chart.

D. Grading, Drainage, and Erosion Control Plans

1. North Arrow (Up or to the right on all sheets).
2. Scale: 1"=50' horizontal.
3. Maximum plan sheet size 11" x 17". Required to provide digital plans in PDF format.
4. Building pads with garage floor elevation, low floor elevation, low opening elevation and building type.
5. All proposed lot corner elevations.
6. Wetland delineations and wetland buffers, creeks, streams, lakes & other water bodies.

7. Existing and proposed normal water level (NWL) and high water level (100-year HWL) for all water bodies within and adjacent to the property, including proposed high water level (100-year HWL) for infiltration basins.
8. Proposed high water level (100-year HWL) contour for all storm water ponds and infiltration basins.
9. All emergency overflow elevations, placed in **BOLD** on the plans.
10. All erosion control measures, permanent and temporary.
11. Grading and erosion control City standard plan notes.
12. Tree protection fencing.
13. Spot elevations for significant trees to be saved.
14. Retaining Walls (wall heights and elevations).
15. Existing storm sewer, drainage and culvert structures to a distance of 150 feet beyond plat boundary with pipe material, size and inverts.
16. Topographical features to a distance of 150 feet beyond plat boundary (fences, trails, sidewalks, streets, driveways, etc.)
17. Property, right-of-way and easement lines.
18. Existing street and driveway widths with type of surface identified.
19. All right-of-way and easements necessary to construct the proposed improvements.

E. Sanitary Sewer and Watermain Plan Sheets:

1. Plan and Profiles for Sanitary Sewer and Watermain shall be placed on the same sheet(s).
2. The following information shall be shown:
 - a. North Arrow (Up or to the right on all sheets).
 - b. Scale: 1"=50' horizontal and 1"=10' or 1"=5' vertical (Maximum sheet size 11" x 17")
 - c. Street names & right-of-way lines.
 - d. Lot and block numbers.
 - e. Location of all existing utilities with pipe material and size.
 - f. Existing and proposed easements.
 - g. Size of mains.
 - h. Material and Class of pipe.
 - i. Length of mains and each sanitary sewer pipe segment.
 - j. Size and type of manholes.
 - k. Proposed grade of each sanitary sewer pipe segment.
 - l. Elevation of inverts of all sanitary sewer lines, at MH and at stub ends.
 - m. Label the depth of watermain relative to proposed ground elevations.
 - n. Arrows indicating the direction of flow on the sanitary sewer plan views.
 - o. Number each sanitary sewer structure on both plan and profile views.
 - p. Stationing of sanitary sewer structures on profile view.
 - q. Proposed main line pipe crossings on the profile views. Maintain 18" minimum separation.
 - r. Proposed storm sewer shown in plan and profile views (background view).
 - s. Sanitary and water service locations and wye stationing on the plan view (from the main line to the utility easement line).

- t. Proposed invert elevations at the utility easement line. Risers must be listed for each lot if needed.
- u. Elevation of the top of the water service stop box at the utility easement line.
- v. Hydrant, valve and fitting locations/stations on the plan view (gate valve or butterfly valve noted as applicable).
- w. Provide proposed surface elevations at all hydrant locations.
- x. Proposed and existing pump or lift stations.
- y. Proposed and existing Well Pumphouses.
- z. Existing grade profile over main line pipe.
- aa. Finished grade profile over main line pipe.
- bb. Centerline stationing at 100 foot minimum intervals.
- cc. Sanitary Sewer City Standard Plan Notes.
- dd. Watermain City Standard Plan Notes.
- ee. All right-of-way and easements necessary to construct the proposed improvements.

F. Street and Storm Sewer Plan Sheets:

- 1. Plan and Profile shall be shown on the same sheet.
- 2. The following information shall be shown:
 - a. North Arrow (Up or to the right on all sheets).
 - b. Scale: 1"=50' horizontal and 1"=10' or 1"=5' vertical (Maximum sheet size 11" x 17")
 - c. Street names.
 - d. Lot and block numbers.
 - e. Existing and proposed easements/rights-of-way.
 - f. Show concrete walks and bituminous paths.
 - g. Sizes of storm sewer pipe.
 - h. Material and Class of storm sewer pipe.
 - i. Length of each storm sewer pipe segment.
 - j. Proposed grades of each storm sewer pipe segment.
 - k. Proposed drainage swale locations, elevations, and grades.
 - l. Elevations on all inverts and castings of all storm sewer structures.
 - m. Arrows indicating the direction of flow on the storm sewer plan views.
 - n. Number of each storm sewer structure on both plan and profile views.
 - o. Proposed watermain and sanitary sewer shown in plan and profile views.
 - p. Proposed pipe crossings on the storm sewer profile views.
 - q. Existing grade profile over storm sewer pipe.
 - r. Finished grade profile over storm sewer pipe.
 - s. Finished centerline street elevations every 50 feet minimum.
 - t. Centerline stationing.
 - u. Street grades on profile.
 - v. Vertical curve data on profile.
 - w. Horizontal alignment and curve data on plan view.
 - x. Top of curb elevations at the beginning, mid-point and end of all radii and at all intersections where drainage is a concern, at maximum or at minimum grades.
 - y. Drainage flow arrows at street intersections.

- z. Finished profile for centerline of trails (plan and profiles for trails may be on separate sheets from street and storm sewer plans).
 - aa. Storm Sewer City Standard Plan Notes.
 - bb. Sidewalk and Trail City Standard Plan Notes.
 - cc. All right-of-way and easements necessary to construct the proposed improvements.
3. Drainage Information to be Shown:
- a. Size, type and location of pipe on plan view.
 - b. Locations of service wyes and clean-outs.
 - c. Arrows indicating the direction of flow on the drainpipe.

G. Cross Sections

- 1. Cross sections shall be provided for all street reconstruction work, turn lanes, or when interfacing new streets along existing streets and roadways.
- 2. Cross sections shall be provided for all trails, except when the trail is placed in the boulevard in accordance with a typical standard street section.
- 3. At a minimum, each cross section shall show the following:
 - a. Finished ground to the match points of existing grade.
 - b. Existing ground.
 - c. Right-of-way and easement locations.
 - d. Centerline of proposed improvement.
 - e. Full depth proposed section.
 - f. Label all slopes proposed at maximum grades.
- 4. When provided, cross sections shall be shown a minimum of every fifty (50) feet, at all low points, critical drainage locations, driveways, and at intersections.

H. Street Signage, Lighting, and Pavement Marking Plan

- 1. Signing, Pavement Markings, and Lighting City Standard Plan Notes.

I. Landscape Plan Sheets

- 1. Irrigation Service locations and irrigation Systems.
- 2. Include tree removals, planting schedule, and tree replacement plan.
- 3. Include City Standard Landscaping Plan Notes.

9.03 Record Drawings.

Record drawings must be completed and submitted to the City Engineer to assist the City in the review, verification and acceptance of the work completed. The submittal information outlined below is considered the minimum documentation requirements. The City Engineer may request additional information specific to the improvements as deemed reasonably necessary to verify the work conforms to the approved grading and construction plans.

A. Submittal Requirements:

- 1. As-built Construction Plans shall be certified by the engineer and prepared in accordance with the Plan Sheet Format Requirements.
- 2. All changes from the final construction plans should be indicated on the as-built Construction Record Drawings. All changes shall be lined out and corrections shall be shown in ***bold italics***.

3. Each Record Drawing shall list Contractor's name, Developer Engineer's name, City Project Number, Construction Completion Date, and Record Plan Drawing Number (provided by City).
 4. Final record drawings shall be submitted as one (1) set of full size plans (11" x 17") and submitted in electronic form (on USB DRIVE) with DWG files and PDF files that are printable to scale on 11"x17".
 5. As-built surveyed information shall tie out to benchmarks as indicated on the plans.
 6. GIS shape files must be provided to include all as-built public infrastructure data.
- B. Certified Record "As-built" Grading Plan shall include:
1. Location and as-built elevations at all lot corners.
 2. Location and as-built elevations along all swales, berms, slopes and ditches.
 3. Location and as-built elevations at all emergency overflow (EOF) points.
 4. All finished grades for pond cross sections.
 5. Location and as-built elevations at high water levels (HWL) for ponds and low points.
 6. Location and as-built for all storm sewer structures including inverts and overflows.
 7. Location and as-built elevations at all retaining walls, including top and bottom of wall at maximum wall height locations.
 8. Location and as-built elevations for any private wells or wastewater systems.
 9. Location and as-built elevations for other features critical to drainage performance.
 10. Contours for all HWL, wetland, and other water bodies, buffers and setbacks.
 11. Property lines and easements.
 12. Location of all existing utilities.
 13. As-built grading plan must conform to the approved final grading plan. As-built elevation shots not within +/- 0.2 feet of proposed elevations are subject to rejection and re-work at the discretion of the City Engineer.
- C. Certified Record "As-built" Construction Plans shall include:
1. As-built surveyed elevations for sanitary and storm sewer manhole and catch basin casting/inlet tops and inverts, flared end section inverts, and any other structure elevations shown on the as-bid drawings. Actual elevations must be recorded to the nearest 0.01 foot, and the actual pipe grades recorded to the nearest .01%.
 2. Sanitary and storm sewer lines field measured from center of casting to center of casting or from center of casting to end of flared end. Record lengths to nearest 0.5 foot.
 3. All changes from planned pipe, structure, or hydrant locations.
 4. Measured distances from center of casting to end of stubs for sanitary and storm sewer.
 5. Ties from ends of watermain stubs to permanent structures.
 6. Ties for draintile cleanouts to permanent structures.
 7. Service ties for the curb box for each lot. Including pipe quantity, size and type on plans.
 8. All sewer services with stationing from downstream manhole to wye location. Pipe quantity, type and invert elevation at utility easement line shall be shown.
 9. Location of watermain fittings (i.e. bends, tees, etc.).
 10. Top nut of hydrant elevations.

11. All pipe insulation.
 12. As-built surveyed elevations for top of curb in sufficient quantity to verify street grades.
 13. All lot address numbers shown on both utility and street record plans.
- D. Private Water/Wastewater Facilities: Record drawings shall be provided in the format consistent with the requirements for public infrastructure as prescribed herein:
1. Tie information for all underground structures.
 2. Location and as-built elevations for any system structures, pipes, pipe slopes, pipe lengths, valves, clean-outs, and other facilities.
 3. Property lines and easements for the facilities.
 4. Detail on the plans any revisions or deviations from the approved design.
 5. Operation & Maintenance manual including:
 - a. Operational performance characteristics for all pumps.
 - b. All electrical and control information including electrical console schematics.
 - c. All mechanical information, parts data, and operational instructions.
 - d. Facility Operation instructions and procedures.
 - e. Emergency mitigation measures.
 - f. Chemical treatment schedules.
 - g. Permit documentation and reporting requirements.
- E. Public Infrastructure Inventory Requirements: Final quantity tabulations shall be submitted for the following information:
1. Sanitary Sewer Pipe, by footage and pipe size.
 2. Watermain, by footage and pipe size.
 3. Number of Hydrants, Gate and Butterfly Valves, Manholes, Catch Basins, and Lift Stations.
 4. Number of Sanitary Sewer Services, by pipe size.
 5. Number of Water Services, by pipe size.
 6. Number of Drain Tile Services, by pipe size.
 7. Storm Sewer Pipe, by footage and pipe size.
 8. Number of Pollution Control Structures (Sumps, Grit Chambers, Pond Skimmers), by type.
 9. Number of Ponds and Sedimentation Basins, by type. Each listed with water surface area and volume at NWL and HWL.
 10. Number of Storm Sewer Outlet Structures, by size.
 11. Number of Alternative Stormwater Drainage Facilities (BMP's), by type of BMP.
 12. Public Streets by lineal footage and square yard.
 13. Private Streets by lineal footage and square yard.
 14. Sidewalks by lineal footage and square yard.
 15. Trails by lineal footage and square yard.

PART 10. DRAFT DEVELOPER'S AGREEMENT

A Draft Developer's Agreement is available from the City Clerk-Administrator.

PART 11. DETAILS

The City Standard Details are specific requirements for the construction of public infrastructure. All drawings which apply to the specific project shall be included in the plan drawings. Details which do not pertain to the project shall NOT be included. City Standard Plan Notes shall be placed on the stated plan sheets of the construction drawings.

The standard details shall be used in the preparation of plans and specifications. Details higher on the list supersede details lower on this list when similar:

11.01 Standard City Details – Found at empiremn.gov/designmanual

11.02 MnDOT Standard Plans and Details – Available online at www.dot.state.mn.us.

11.03 Manufacturer Details for the item or material furnished.

11.04 Details prepared by the Developer or their Consultant.