



2023 Public Works Design Manual

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Prepared with the assistance of





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PART I
GENERAL PROVISIONS & ADMINISTRATIVE REQUIREMENTS

SECTION ONE:
PURPOSE

Since the City assumes perpetual ownership, maintenance and operation of the public infrastructure facilities referenced herein together with the inherent obligation and responsibility associated with the ownership thereof, it is necessary to ensure these facilities are designed and installed in a manner, which minimizes the City's future financial and operational liabilities. The purpose of the **Public Works Design Manual** is to provide a reference for developers, builders, and their engineers, as well as City engineering and consulting engineering personnel, for use in design, construction, and connection to public infrastructure facilities within the City.

SECTION TWO:
ADMINISTRATIVE/PROCEDURAL REQUIREMENTS

- 2.1 PLATTING REQUIREMENTS:** Refer to Chapter 107 – Subdivisions of the Oak Grove City Code Subdivision administrative/procedure for platting requirements associated with land development.
- 2.2 DESIGN AND INSTALLATION OF PUBLIC INFRASTRUCTURE IMPROVEMENTS (INCLUDING CITY-INITIATED IMPROVEMENTS):** The City has traditionally required the developer to construct the facilities under the terms of a Development Contract for subdivisions and commercial site plans. The process for developer installed improvements is described in detail in 2.4 below. The developer has the option to request the City to install public infrastructure facilities necessary to serve the proposed development under a public improvement project. The City Council retains full discretion to deny the request. If the facilities necessary to serve a development are to be publicly funded, the City may choose to design and install the facilities as a public improvement project in accordance with M.S. Chapter 429.
- 2.3 PUBLIC IMPROVEMENT PROCESS:** The following is a guide outlining steps in the Public Improvement process. Some of these steps may not be applicable for City-initiated improvements.
- A. Feasibility Report Phase:**
1. Request is made for a public improvement, the City holds a neighborhood information meeting to explain the special assessment process.
 2. Preliminary plat conditionally approved by the City Council, if applicable.
 3. Petition requesting public infrastructure installation by the City presented to City Council for feasibility report preparation authorization.
 4. City Council authorizes preparation of feasibility report or denies request.



5. Developer submits preliminary plat and grading plan for use in preparation of feasibility report, if applicable.
6. Present feasibility report to City Council for consideration of scheduling public hearing.
7. City Council schedules a public hearing or denies project.
8. City Council holds public hearing on project and approves or denies project.

B. Plans & Specifications (P & S Phase):

1. City Council approves project at public hearing, orders plans and specifications.
2. Developer submits final plat, if applicable.
3. Developer submits final development grading plan, if applicable.
4. City, or its chosen consultant, prepares detailed plans and specifications.
5. City Council approves or rejects detailed plans and specifications.
6. City Council authorizes advertisement for solicitation of competitive bids and determines a bid date.
7. Bid amount is verified and compared to feasibility report cost estimate and engineer's cost estimate.
8. The bid amount comparison to feasibility report cost estimate and engineer's cost estimate is presented to City Council for consideration of contract award.
9. Final plat approved by City Council, if applicable.
10. Final plat recorded at Anoka County, by Developer, if applicable.
11. All easements/rights of entry are properly executed.

C. Assessments Phase:

1. Engineering/Finance Department prepares assessment rolls based on construction bids and projected overhead costs and presents to City Council.
2. City Council schedules assessment public hearing.
 - a. Prepare assessment information sheet for City Council review (*i.e. number of years, average assessment, project number, etc.*)
 - b. Prepare detailed individual assessment notices and mail to affected property owners.
3. Hold Assessment Hearing
4. City Council awards contract to lowest "responsible bidder" or rejects/cancels bids and re-advertises.
5. Record pre-payments, if applicable.
6. Certify adjusted roll to County Auditor for collection.
 - a. When the assessment amount is certified to the County Auditor prior to November 30th of the current year, the amount of the assessment will be reflected on the tax statement due and payable the following year.
 - b. When the assessment amount is certified to the County Auditor after November 30th of the current year, the amount of the assessment will be reflected on the tax statement due and payable the year after the following year.



D. Construction Phase:

1. All regulatory agency permits are obtained and received by City.
2. The contract documents are properly executed.
3. The Certificates of Insurance requirements as identified in the contract documents are provided with the City of Oak Grove and their Agents listed as an additional insured.
4. Pre-construction conference is held at the City offices.
5. "Notice to Proceed" is issued to the contractor.
6. City's Engineering Department inspects erosion control measures prior to land disturbing activity.
7. Construction is inspected by the City's Engineering Department personnel or the City's consulting engineering personnel.
8. Contract final inspection/close-out.
9. Contract completion/final payment authorization by City Council.
10. City assumes perpetual maintenance responsibilities.
11. Warranty period begins.
12. Warranty inspection, 90 days prior to expiration.

2.4 DEVELOPER INSTALLED IMPROVEMENTS: The developer may elect to assume responsibility for the design and installation of public infrastructure facilities necessary to serve a proposed development. The developer is required to enter into a "Development Contract" with the City, which ensures the City that the required public infrastructure facilities necessary to serve the development will be installed in a timely manner and in accordance with the standards and specification as set forth by the City Code.

As set forth in Division 5 of Chapter 107 of the City Code, developers of property within the City of Oak Grove are required to submit detailed plans and specifications of proposed improvements for review and comment by the City. These plans and specifications are required to be prepared by professional engineers licensed to practice within the State of Minnesota. The engineer who designs, prepares and certifies plans does not lose his primary responsibility for the accuracy and adequacy of the plans when the plans are reviewed and approved by the owner.

Except those improvements designed and constructed by the City, it is the responsibility of the developer to determine and obtain all necessary approvals, permits and licenses from the City of Oak Grove, Minnesota Department of Transportation, Anoka County Highway Department, appropriate watershed district or watershed management organization, utility companies, Minnesota Department of Natural Resources, Army Corps of Engineers, Minnesota Pollution Control Agency, Metropolitan Council, Minnesota Department of Health and any other regulatory or jurisdictional agency affected by or having jurisdiction over the improvements required for the proposed development. Any design requirements of any such agencies shall be determined and incorporated into plans and specifications. All costs incurred to obtain said approvals, permits and licenses and also all fines or penalties levied by an agency due to the failure of the developer to obtain or comply with conditions of such approvals, permits and licenses shall be the sole responsibility of the developer. The developer agrees to defend and hold the City harmless from any action initiated by a regulatory agency resulting from such failures of the developer.



When the Developer chooses to install required public improvements within its own development, the following is intended to outline the steps necessary for this process:

- A. Preliminary plat general design is conditionally approved by the City Council.
- B. Developer submits final plat application that includes detailed plans, specifications and copies of all design calculations to the City for review and comment. These plans are to be prepared in accordance with current City Standards as outlined herein and the applicable sections of the City Code.
- C. City staff reviews submission **utilizing the site plan review checklist** and provides comments to Developer.
- D. Developer submits revised submittal for staff review and comment together with City “redline” copy of required revisions.
- E. Developer submits a cost estimate or bid of the construction work to be done.
- F. City prepares Development Contract. After completion of all required submittals, the City computes the Letter of Credit amount and the financial requirements in accordance with the City’s most recent fee schedule.
- G. After signatures are obtained, the Development Contract and Final Plat are scheduled for Council approval.
- H. After City Council approval of the Development Contract and Final Plat, the construction phase begins. The Developer will be required to submit a notice showing insurance coverage has been provided, along with a Letter of Credit and all fees outlined in the Development Contract.
- I. The City shall inspect the improvements and the Developer shall provide the remaining construction services as outlined in the Development Contract.

Comment [JD1]: Text added to satisfy MS4 permit requirement 19.6

**SECTION THREE:
GRADING/EXCAVATION PERMIT**

Chapter 109, Article VII – Shoreland Management of the City Code, references requirements for grading permit issuance within the City of Oak Grove. A grading/excavation permit is required for any removal, storage or excavation of earth material or to fill or raise the existing surface grades within the City, which exceed 500 square yards or 50 cubic yards of material. The contractor is required to pay a permit fee as outlined in the current City fee schedule and to provide insurance and a Letter of Credit in the amount of \$2,000 per acre of disturbed area or as outlined in the City fee schedule. A developer may obtain a grading permit after preliminary plat approval. The City will review the grading, drainage and erosion control plans prior to issuance of the grading permit.

Chapter 9, Article V – Conditional Use and Interim Use Permits regulates grading in excess of 1,000 cubic yards.

Prior to any grading, a Pre-construction Conference shall be held between the Developers, the City, the Contractor, and all other parties involved. Prior to any clearing and grubbing or grading operations, silt fence shall be installed by the Contractor and inspected by the City.



Upon completion of the grading plan, the Developer shall provide a “record drawing” grading plan to verify that the site was constructed as shown and to note all changes which may have occurred during the grading process. The “record drawings” grading plan shall be reviewed by the City and become the record document for the proposed development. The grading permit security deposit shall not be released until the “record drawing” grading plan has been approved by the City.

- In Summary, requirements for a permit are:
- Preliminary plat approval
 - Approved grading plans
 - Copy of NPDES and any other applicable permits
 - Letter of Credit
 - Permit Fees
 - Certificate of Insurance

**SECTION FOUR:
WORK WITHIN CITY EASEMENTS/RIGHT-OF-WAY**

In accordance with Chapter 22, Article II – Right of Way Management, the City requires a utility permit to be issued by the City for any excavation, opening or tunneling, across or upon a street or other public property within the City for the installation of private utilities.

All work within public right-of-way requires a traffic control plan and implementation in accordance with Minnesota Manual on Uniform Traffic Control Devices (most recent edition).

No irrigation heads shall be placed within 3 feet of bituminous pavement. No irrigation heads shall be placed within 1 feet of concrete curb and gutter.

**SECTION FIVE:
GRADING/DRAINAGE/EROSION & SEDIMENT CONTROL/RESTORATION**

A grading, drainage, erosion and sediment control restoration plan prepared in accordance with the standards as outlined in Minnesota Stormwater Manual, published by the Minnesota Pollution Control Agency, or an equivalent set of standards is required for all construction activities within the City.

The developer must also provide proof of coverage under the most current Minnesota Construction Stormwater General Permit (MNR100001) along with submission of the grading, drainage, erosion, and sediment control restoration plan. Coverage under the most current Minnesota Construction Stormwater General Permit (MNR100001) is required for all construction activities that result in land disturbances equal to or greater than one (1) acre or if a project is part of a common plan of development or sale that ultimately will disturb greater than one (1) acre.

Comment [JD2]: Additional text added to PW design manual to satisfy MS4 permit item 19.6

A record drawing grading plan is required certifying that the grading conforms to the detailed development grading plan is required prior to building permit issuance. The City may withhold issuance of building



permits until the approved, certified grading plan is on file with the City and all erosion control measures are in place as determined by the City Engineer.

**SECTION SIX:
PARKING LOT CONSTRUCTION/EXPANSION**

Chapter 109, Article VI – Supplementary Regulations of the Oak Grove City Code contains requirements for construction of off-street parking facilities within the City. Parking lot construction/expansion not associated with development or a building permit issuance requires a grading/excavation permit in accordance with Chapter 109, Article VII – Shoreland Management if within a shoreland impact zone, of the City Code.

**SECTION SEVEN:
EASEMENTS**

Oak Grove City Code contains requirements relating to protection of public infrastructure facilities within the City.

**SECTION EIGHT:
SECURITY AND WARRANTY REQUIREMENTS**

See specifications or Development Contract for warranty requirements.

A separate security is required for the grading, erosion and sediment control and restoration when obtaining a grading permit. The amount of the security is based on \$2,000 per disturbed acre of the site development or as outlined in the City’s current fee schedule.



PART II

DESIGN AND CONSTRUCTION STANDARDS

The design and construction of public infrastructure facilities shall be performed in accordance with the most recent editions of the Minnesota Department of Transportation “**MnDOT Standard Specifications for Construction**” and any amendments thereto, and the “**Standard Utilities Specifications for Watermain and Service Line Installation and Sanitary Sewer and Storm Sewer Installation**” as published by the City Engineers Association of Minnesota or as modified herein. All designs must incorporate the requirements identified in the City’s Comprehensive Plans in effect at the time of the infrastructure design and installation.

SECTION ONE:

GRADING/EROSION CONTROL/SITE RESTORATION:

This work shall be done in accordance with the most recent editions of the “**MnDOT Standard Specifications for Construction**” and the “**Minnesota Stormwater Manual**” (Best Management Practices) prepared by the Minnesota Pollution Control Agency. The planning handbook will guide the developer and their engineer in protecting the land and water resources of the City during land development.

The following criteria site erosion control shall apply to all construction activities in the city:

- 1.1 Channelized runoff from adjacent areas passing through the site shall be diverted around disturbed areas, if practical. Otherwise, the channel shall be protected as described below. Sheetflow runoff from adjacent areas greater than 10,000 square feet in area shall also be diverted around disturbed areas, unless shown to have resultant runoff rates of less than 0.5 cubic feet per second across the disturbed area for the one-year storm. Diverted runoff shall be conveyed in a manner that will not erode the conveyance and receiving channels.

All activities on the site shall be conducted in a logical sequence to minimize the area of bare soil exposed at any one time. Runoff from the entire disturbed area on the site shall be controlled by meeting either subsections (A) and (B) or (A) and (C):

- A. Prior to September 15, all disturbed ground left inactive for 14 or more days shall be stabilized by seeding or sodding or by mulching or covering or other equivalent control measure. After September 15, such disturbed ground shall be stabilized by mulching or covering or other equivalent control measure.
- B. For sites with more than ten acres disturbed at one time, or if a channel originates in the disturbed area, one or more temporary or permanent sedimentation basins shall be constructed. Each sedimentation basin shall have a surface area of at least one percent of the area draining to the basin and at least three feet of depth and constructed in accordance with accepted design specifications. Sediment shall be removed to maintain a depth of three feet.



The basin discharge rate shall also be sufficiently low as to not cause erosion along the discharge channel or the receiving water.

- C. For sites with less than ten acres disturbed at one time, silt fences, straw bales, or equivalent control measures shall be placed along all side slope and downslope sides of the site. If a channel or area of concentrated runoff passes through the site, silt fences shall be placed along the channel edges to reduce sediment reaching the channel. The use of silt fences, straw bales, or equivalent control measures must include a maintenance and inspection schedule.

Any soil or dirt storage piles containing more than ten cubic yards of material should not be located with a downslope drainage length of less than 25 feet from the top of the pile to a roadway or drainage channel. If remaining for more than seven days, they shall be stabilized by mulching, vegetative cover, tarps, or other means. Erosion from piles, which will be in existence for fewer than seven days, shall be controlled by placing straw bales or silt fence barriers around the pile. In-street utility repair or construction soil or dirt storage piles located closer than 25 feet from a roadway or drainage channel must be covered with tarps or suitable alternative control, if exposed for more than seven days, and the storm drain inlets must be protected with straw bales or other appropriate filtering barriers.

1.2 The City requires the developer to provide to the following for submittal of grading, erosion and sediment control plans:

- A. All regulatory agency permits and approvals including those from the Minnesota Pollution Control Agency for "General Storm Water Permit for Construction Activity".
- B. Show adjacent plats, parcels, property lines, section lines, streets, existing storm drains and appurtenances, etc.
- C. Signature of company responsible for erosion and sediment control plan preparation, implementation and maintenance.
- D. Extend existing 2-foot contour lines a minimum of 200 feet beyond the property boundary or more as needed to accurately depict the existing drainage patterns.
- E. Lot corner elevations and benchmark utilized.
- F. Maximum 3:1 slopes are allowed in "maintained" areas except approved by the City Engineer. Maximum 3:1 slopes are allowed for road sections.
- G. Show the normal water level (NWL), the high water level (HWL) for ponds, and the ordinary high water level (OHWL) for water bodies based upon the most recent City's Local Surface Water Management Plan criteria. Show the 10-foot recovery area. All ponds shall provide a minimum of one foot of freeboard to any adjacent street pavement. This freeboard shall be measured to either the emergency overflow elevation or the critical high water elevation of back to back rainfall event or the snowmelt event.
- H. Show all existing and proposed easements on the plan.
 - I. Show the first floor, the lowest opening and the lowest floor elevations. The developer's Engineer shall prepare a chart that includes the lowest floor elevations and the seasonal high ground water elevation at the proposed building location. Oak Grove considers the existence of redoxymorphic soils as an indication of the seasonal high ground water elevation. A deep boring at the proposed building location extended at least 2 feet below the proposed floor elevation shall be completed with a

determination of the existence of redoxymorphic features. If the developer encounters conditions that indicate redoxymorphic soil features are not reflective of the seasonal high ground water, they may request using an alternative method of determining the seasonal high ground water elevation. Also, 4 borings are required at the drain field location to verify the ability to construct a drainfield. Additional borings are required to show that at least 11,000 square feet of the property is at least 2 feet above redoxymorphic soil features. Refer to Chapter 109, Article VIII – Shoreland Management, for requirements in Shoreland Districts and for requirements in flood plain areas.

- J. If retaining walls are needed, submit detailed plans and specifications that show type and height of retaining wall. Retaining walls will not be allowed within the City's easements, unless approved with the overall subdivision-grading plan.
 - K. Show City of Oak Grove's project number on the Plan.
 - L. Show emergency overflow routes from all low points and show elevation of high point along emergency overflow route. All emergency overflow routes shall be graded and the easement area sodded prior to building permit issuance.
 - M. Show removal of all trees and brush below the controlled water level that will be impacted from existing and newly created ponding areas.
 - N. Show or define access routes for maintenance purposes to all inlets or outlets at ponding areas (must be maximum of 8% grade, 2% cross slope and 10' wide).
 - O. Show limits of clearing and grading.
 - P. Show all existing and proposed grades. Required standard is 2' contours with existing contours shown as dashed and proposed contours shown as solid.
 - Q. Show 10-year design and 100-year design drainage boundaries.
 - R. Provide existing and proposed hydrologic/hydraulic calculations for 10 and 100 year rainfall events. If ponds do not have an outlet, the critical condition will be high water elevation from either back to back 100 year rainfall events or a 10 day, 100-year snowmelt event.
 - S. Provide drawings showing the existing and proposed drainage boundaries.
 - T. Provide detailed hydrologic/hydraulic calculations verifying location and capacity adequacy of all overland drainage routes. Consult the City's Local Surface Water Management Plan for further detail on design criteria.
 - U. A note for all silt fence to be installed by the contractor and inspected by the City prior to any site work.
 - V. Minimum grade for drainage swales and lot grading shall be 1% or greater.
 - W. Slopes greater than to 3:1 shall have erosion control blanket installed immediately after finished grading.
 - X. The top berm elevation of the sediment pond shall be a minimum of one foot higher than the HWL of the pond.
- 1.3 Buffer Strip Requirement: A buffer strip shall be maintained around the perimeter of all wetlands. The buffer strips shall meet the following requirements:
- A. Buffer strips shall be measured from the ordinary high water level of the wetland and meet city ordinance requirements.



- B. Buffer strips shall be required whether or not the wetland is on the same parcel as the proposed development or on an adjacent parcel.
- C. Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is required, unless the applicant receives approval to replace such vegetation.
- D. Buffer strips shall be identified within each parcel by permanent monumentation. A monument shall be required at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer strip. Additional monuments shall be placed as necessary to accurately define the edge of the buffer strip. A monument shall consist of a post and a buffer strip sign. The signs shall be 5-inch x 7-inch vertical, have brown field with white lettering, and shall be securely mounted on a post to a minimum height of 4 feet above grade. The signs shall include warnings about disturbing or developing the buffer strip. The signs shall be installed prior to the issuance of a building permit.

During Construction the City requires the following:

- 1.4 Construction inspection and testing: All land disturbing activities shall be subject to inspection by the city. Inspection of land disturbance operations and special testing shall be performed by the applicant as set forth in this manual and as set forth in the land disturbance permit conditions of approval.
 - A. Inspector. The inspector acting on behalf of the applicant shall be a qualified person who shall demonstrate his competence, to the satisfaction of the city, for inspection of the particular type of land disturbing activity, testing procedure or operation requiring inspection.
 - B. The inspector shall observe the work assigned for conformance with the reviewed design drawings and specifications.
 - C. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority and to the city.
 - D. The inspector shall submit inspection reports stating whether the work or test requiring inspection was in conformance with the reviewed plans and specifications. The inspection reports shall be furnished to the city and other designated persons as required in the approved land disturbance plan.
 - E. Periodic inspection. Some inspections may be made on a periodic basis and satisfy the requirements of continuous inspection, provided this periodic scheduled inspection is performed as outlined in the land disturbance plans and specifications and approved by the city.
 - F. Storm water pollution prevention plan items shall be inspected as required by this manual. At a minimum, these inspections shall be done weekly by the applicant and within 24 hours after every rainfall event 0.5 inches or greater in 24 hours. Inspection reports shall include, at a minimum, date and time of inspection, name of person conducting inspection, findings of inspection including any recommended corrective actions, corrective actions taken since previous inspection, and the date and amount of rainfall events of 0.5 inches or greater.

**SECTION TWO:
STREETS**



2.1 Widths: Street widths shall be as determined in the Comprehensive Development Plan and official map, and shall conform to county and state standards for trunk highways. If there are no such plans or standards, right-of-way widths shall conform to the dimensions listed below. Flexible pavement design shall be based on design procedures set forth in the "Road Design Manual II" 7-5.0 prepared by the MnDOT. Minor or collector streets shall be designed as follows:

Collector Street (9 Ton design)	80' R.O.W.	Roadway	44' Urban 40' Rural 8' min. shoulder
Minor Street (7 Ton design)	66' R.O.W.		32' Urban 24' Rural 3' Min. Shoulder
Cul-de-sac Street (7 Ton design)	66' R.O.W.		32' Urban 24' Rural 3' Min. Shoulder
Cul-de-sac (7 Ton design)	60' R.O.W.		45' Radius Pavement 3' Shoulder

Greater or lesser widths may be required depending upon anticipated traffic volumes, planned function of the street, and character of planned abutting land use.

2.2 Alternative Road Section: In instances where, due to topography, the use of a rural road section would necessitate the clearing of mature trees more than 15 feet beyond the right-of-way limits, the developer may utilize an urban road section incorporating an integrally cast concrete curb. In such instances as the City approves the use of urban road section, the roadway width, as measured gutter line to gutter shall be as indicated above.

2.3 Curves and Radii: Horizontal and vertical curves for collector streets, shall be designed to meet a 50 M.P.H. design speed where possible with a minimum design speed of 40 m.p.h. Two-way traffic shall have the road surface widened to 30 feet in width minimum through the intersection. All horizontal curves shall be designed with a minimum superelevation of 0.02 ft./ft. cross slope up to a maximum of 0.06 ft./ft. unless otherwise directed by the City Engineer. All radii shall be a minimum of 38 feet at intersections as measured to the bituminous surface edge.

2.4 Driveways and Mailboxes: Driveways shall be constructed of a hard packed surface material capable of supporting emergency vehicles. Driveways shall be paved a minimum 20-feet beyond the travel lane or within public right-of-way whichever is greater in length. All newly constructed or upgraded driveways shall have an appropriately sized culvert purchased from the City and installed during construction unless the Public Works Supervisor or City Engineer determines one is unnecessary. All driveway culverts shall be 28 feet in length and a minimum 15-inches in diameter and either Correggated Metal Pipe (CMP) or Reinforced Concrete Pipe as determined by Public Works Supervisor or City Engineer. Driveways that are installed without Public Works Supervisor or City Engineer input, may be required to be removed and replaced.



The principal dwelling is allowed an initial single access to the roadway, provided the driveway installation meets requirements. An additional driveway must obtain City approval. Any driveway shall provide a minimum approach width of 16 feet at the road right-of-way and a minimum clearance of 13 feet in height for access by emergency vehicles. All driveways are subject to the dimensional standards in Chapter 109, Division 2 – Dimensional Standards of the City Code. For corner lots secondary driveway setbacks to side lot line abutting right-of-way shall be a minimum 75-feet. Sharp turns shall allow for additional turning radius. Driveways shall be constructed with a side slope on either side of the driveway of three feet in length for each one foot of height. In no case shall any obstruction be placed in a ditch or culvert adjacent to such driveway.

When mailboxes are replaced, such mailboxes shall be designed to break away or collapse upon impact to prevent serious injury or damage to person or property. In no case shall bituminous paving extend onto private property as part of the road improvements.

- 2.5 Trail and Sidewalk Widths: All sidewalks and trails shall, when installed, conform to the following widths:

<u>Classification</u>	<u>Sidewalk Width</u>	<u>Trail Width</u>
Residential districts	5 feet	10 feet
Commercial districts	8 feet	10 feet
Industrial districts	5 feet	10 feet

- 2.6 Trail Design Standards: The trail design standards are as follows:

DESIGN CRITERIA FOR PEDESTRIAN PATHS

- Design Speed: Modified 15 mph Signed at Trail Head as Safe Speed
- Horizontal Curvature: 15 mph with a minimum 35 foot radius
- Cross Slope/Superelevation: 0.02 ft/ft with no adverse superelevation allowed
- Vertical Curves: **Comfort Sag**
 - L=(5)A for 15 mph
 - Example – 10% Grade Change = 50 feet for 15 mph
 - Minimum Curve Length = 50 feet
 - No Curve Required for Grade Change less than 1%
- Crest Curve**
 - $L=A(S^2)/750$ When $S < L$ or
 - $L=2S-750/A$ When $S > L$
 - Example – 10% Grade Change = 95
 - No Curve Required for grade change less than 1%
 - Minimum Curve Length of 50 feet
 - L = Length of Curve
 - A = Algebraic Difference in grade
 - S = 85 for Design Speed of 15 mph
- Clear Zone: 5 feet from travelled lane
- Grades: 2% no longer than 1,500 feet
- 5% no longer than 300 feet



Sight Distance: Areas where sight distance clearing is excessive may be signed for limited sight distance rather than clearing.

Width and Clearance: 10 foot minimum width with 2 foot shoulders

Drainage: A drainage ditch of suitable dimension may be necessary on the uphill side, on a curve, to keep the proper cross slope (see detail).

Soil borings and/or special design considerations may be required by the City Engineer in areas where unstable soils exist.

- 2.7 Pavement Design Calculations. A soils report shall be submitted by a Registered Professional Soils Engineer outlining the recommendations for the pavement design which in no event shall be less than the standards set forth in Subd. 8, B and C of the Chapter upon City Engineer's request. On local streets within the Zimmerman, Isanti, Lino soils association, the developer may use a minimum pavement section of 5 inches of class 5 and 3 inches of bituminous pavement placed in two lifts.
- 2.8 Street alignment for local streets, both vertical and horizontal, shall be designated for 30 MPH design speed based on the ~~1993~~ current edition of American Association of State Highway and Transportation Officials Policy on Geometric Design of Highways and Streets Manual unless otherwise approved by the City Engineer. One exception is the use of a "corner curve" on a local street. A radius of 135 feet to the centerline of a curve may be used to make a corner on a local street within a plat. The curve shall be superelevated to 2% and the pavement shall be widened to 30 feet. The roadway embankment shall be widened to 32 feet to allow a one foot shoulder beyond the pavement. The curve shall have a speed advisory sign of 20 M.P.H.
- 2.9 Vertical Alignments. Street Grading. The City Engineer shall approve grades. Minimum street grade shall be 0.5 %. The design maximum shall be 6.00% for minor streets and 4% for collector streets. At intersections, the street grade shall not exceed 3.00% for the first 100' approaching said intersection. The last 50 feet to the intersection shall not exceed 1.00%. The 100' is measured from the edge of shoulder or the curb line of the intersected street. In cul-de-sacs, the gutter grade shall not be less than 0.80%. A 2.5% cross-slope grade is required of all street cross-sections. The minimum curb return radius shall be 20'. The minimum grade around curb returns shall be 0.50%.
- 2.10 Vertical Curves. Different connecting street gradients shall be connected with vertical curves. Minimum length, in feet, of these curves shall be twenty times the algebraic difference in the percent of grade of the two adjacent slopes. A change in grade less than 1% can use a point of vertical inflection. A change in grade of 1% or greater shall use a vertical curve with a minimum length of 50 feet.
- 2.11 Sidewalk Grades. Sidewalks shall slope ¼ inch per foot away from the property line and the profile of the grade shall not exceed 6 percent.
- 2.12 Streets shall be laid out so as to intersect as nearly as possible at right angles, 90 degrees. In no case shall the angle formed by the intersection of two streets be less than seventy-five (75) degrees, and not have more than 4 corners. Pavement shall be rounded by a radius of not less than thirty-eight (38) feet.



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- 2.13 Street Jogs. Street jogs with centerline offsets of less than one hundred fifty (150) (feet?) shall be avoided for minor streets.
- 2.14 Deflections. When connecting street lines deflect from each other at one point or more than five (5) degrees, they shall be connected by a curve with a radius adequate to ensure a sight distance within the right-of-way of not less than five hundred (500) feet for arterials, three hundred (300) feet for collectors, and one hundred (100) feet for all other streets. The Planning Commission may allow greater or lesser sight distances at the recommendation of the Engineer.
- 2.15 Tangents. A tangent of at least three hundred (300) feet shall be introduced between reverse curves on arterial and collector streets.
- 2.16 Unless approved by the City, street intersections and commercial driveway intersections shall match at the centerlines. If the streets or driveways cannot be aligned to match, then the intersections shall be offset as approved by the City Engineer.
- 2.17 Barricades in accordance with the Minnesota Manual on Uniform Traffic Control Devices shall be placed at all dead end streets.
- 2.18 The City requires concrete valley gutters across street and driveway intersections with overland cross drainage with a grade less than 1% or per the City Engineer.
- 2.19 Pavement design. All new streets and upgraded roads shall be designed to provide a rural and urban road section conforming to generally accepted design standards as determined by the City Engineer. Special consideration shall be given to the following factors:
- A. Road Classification. City roads shall be classified pursuant to Chapter 107, Division 4 – Design Standards.
 - B. Geometric Standards. Geometric roadway standards shall be established by reference to “State Aid Manual” most recent edition as prepared by MnDOT.
 - C. Pavement Strength. Pavement strength and design shall be determined by reference to “Road Design” most recent edition as prepared by MnDOT.
 - D. In no case will the use of a pavement section having a granular equivalence of less than 7.5 be permitted.
- 2.20 The design of streets shall accommodate a minimum of a 7’ clear zone behind the curb where trail ways or sidewalks are proposed and a minimum of 10’ in areas without trail way or sidewalk to provide for adequate sight distances and snow storage. The clear zone area will be the boulevard behind the curb. This area shall not contain any landscaping other than a ground cover, and the area shall have a maximum 2% slope.
- 2.21 Retaining walls over four feet in height shall in new subdivisions need to be designed by a Minnesota Registered Professional Engineer. Retaining walls are to be located on private property. The construction of any retaining walls within the public right-of-way will need prior approval of the City Engineer. All retaining walls that need to be constructed in public right-of-way shall be a mortarless concrete block retaining wall system. These walls shall be non-deteriorating and virtually maintenance free. The retaining wall construction will require the submittal of detailed plans and



specifications for a review by City staff. All retaining wall block shall be sealed with an approved sealant prior to winter.

- 2.22 Cul-de-sacs are required on all “dead-end” public streets that are greater than one lot depth. No driveways are allowed on dead-end streets that do not have a cul-de-sac. Temporary “dead-end” situations associated with phased development do not require concrete curb and gutter along the radius of the cul-de-sac. Temporary “dead-end” situations associated with providing access for future extension to and through adjacent undeveloped property require concrete curb and gutter installation.
- 2.23 Collector streets shall be designed to State Aid standards.
- 2.24 Curb and Gutter. Where allowed, concrete curb and gutter shall conform to standards set forth in Title 900 of the City Code. Surmountable concrete curbing may be used in lieu of ditches only if approved by the City Council.
- 2.25 Road Side Ditches. Roadside ditches shall be designed with inslope and outslope grades as required by: “State Aid Manual”. A minimum grade of 0.05 feet per 100 feet will be permitted. Maximum grades shall be established with reference to erosion concerns.
- 2.26 Roll Testing. Such testing shall include a wheel test with a single axle truck loaded to its maximum capacity. The preferred vehicle is a fully loaded water truck.

Applicable Technical Specifications. Division II Construction Details & Division III Materials of “The Standard Specifications for Construction” latest edition as prepared by the Minnesota Department of Transportation shall be adopted as controlling or governing construction of new streets or upgrading roads in the City.

2.27 Materials:

- A. Aggregate base. Class 5 virgin base shall be placed in minimum thickness of five inches. No recycled aggregate material shall be used.
- B. Aggregate base shall meet the MnDOT Class 5 gradation except as modified to require a minimum of 10 percent passing the #200 sieve up to a maximum of 15 percent passing the #200 sieve for gravel surface roads. Aggregate base meeting MnDOT Class 5 gradation only may be used when roads are to be surfaced with bituminous as part of the road improvements.
- C. Plant mixed Bituminous Pavement. Shall meet the requirements of “The Standard Specification for Construction” latest edition as prepared by the Minnesota Department of Transportation 2360. The Engineer will designate the mix design for streets and trails. The City Engineer shall review mix designs at least 2 days prior to any paving.
- D. Sidewalk surfacing. Sidewalks constructed in a new development before the individual home construction shall be a minimum of six (6) inch thick concrete. In existing residential areas, sidewalk may be four (4) inch thick concrete, except where they cross driveways, then sidewalks shall be a minimum of six (6) inches for residential areas and eight (8) inches thick in Commercial areas.



- E. Pipe Culverts. Driveway culverts shall be Corrugated Metal Pipes (CMP) and cross street culverts shall be Reinforced Concrete Pipes (RCP). All culverts shall be fifteen (15) inches minimum diameter.
- F. Topsoil. Topsoil shall meet the MnDOT requirements for topsoil borrow. On-site materials typically do not meet these requirements and must be imported as needed. Subdividers shall submit the necessary tests to show compliance with these requirements. A minimum of 4" of topsoil is required in all areas.
- G. Seed and Fertilizer. The Engineer will designate the seed and fertilizer using mixtures defined in the MnDOT Specifications. The City Engineer will review the mixtures.

**SECTION THREE:
STORM SEWER**

- 3.1 Storm water plans for the development shall comply with all applicable approved Surface Water Management Plans.
- 3.2 Storm water facilities shall be designed for a 10-year frequency rainfall event for local pipe design and a 100-year frequency storm for ponding detention basin design and trunk facilities. Rainfall data from NOAA Atlas 14, Volume 8 shall be used for designing these facilities.
- 3.3 Storm sewer facilities shall use design criteria utilizing either the rational method or a hydrograph method based on sound hydrologic theory to analyze the storm water runoff and proposed development. Overall drainage analysis shall use the Soil Conservation Service TR-20 or HydroCAD.
- 3.4 The developer shall obtain all regulatory agency permits and approvals necessary for the proposed construction; i.e. DNR, Army Corp. of Engineers, MPCA, Oak Grove.
- 3.5 Drainage calculations shall be submitted to show the sizing of pipe, ponds, emergency overflow spillways, and catch basin interception analysis.
- 3.6 Provide for overflow routes to drain low points along streets or lot lines to ensure a freeboard of 2' from the lowest exposed structure elevation and the calculated 100 year storm HWL elevation. Design criteria verifying the adequacy of the overland drainage route capacity is required.
- 3.7 The storm sewer alignment shall follow the sanitary sewer and watermain alignment where practical with a minimum of 10' of separation. Storm sewer placed along the curb alignment shall be along the curb opposite the watermain to maintain the 10' separation.
- 3.8 Catch basins shall be located on the tangent section of the curb at a point 3' from the point of curve. Mid-radius catch basins will not be allowed. Also, catch basins shall be designed to collect drainage on the upstream side of the intersection.
- 3.9 The maximum spacing between manholes is 400'.



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- 3.10 Manhole steps will be aligned and over the downstream side of the manhole. Steps within manholes will be:
- A. 1" +/- Horizontal Alignment
 - B. 1" +/- Vertical Alignment per latest OSHA Standards.
- 3.11 Any connections to existing manholes or catch basins shall be core drilled or the opening cut out with a concrete saw. No jack hammering or breaking the structure with a maul is permitted. Also, all connections to an existing system will require a manhole for access.
- 3.12 To the greatest extent possible, manholes shall be placed in paved surfaces outside of wheel paths, (3' and 9' off centerline) or other readily accessible areas.
- 3.13 Minimum pipe size shall be 15" diameter.
- 3.14 Type of pipe within right-of-way shall be Reinforced Concrete Pipe (RCP). The class of pipe shall conform to the design standards for maximum allowable fill height for RCP pipe.
- 3.15 Aprons or flared end sections shall be placed at all locations where the storm sewer outlets a ponding area. Inlet/outlet flared end sections shall be furnished with hot dipped galvanized trash guards if required by the City Engineer. All trash guard installations will be subject to approval by the City Engineer. The last three pipe joints from the flared end section shall be tied together.
- 3.16 Riprap and filter blanket shall be placed at all outlet flared end sections. The placement of the riprap shall be hand placed. The minimum class of riprap shall be MnDOT 3601.2, Class III. Design criteria justifying the size and amount of riprap is required. Geotextile material is not allowed for filter aggregate where ice action along the shore line may tear the geotextile. Three inches of black dirt shall be placed over the rip rap, then seeded or sodded.
- 3.17 The invert elevations of the pond inlet flared end sections shall match the NWL of the pond. Submerged outlets will only be allowed at the discretion of the City Engineer. A 10' recovery area shall be designed for each pond.
- 3.18 If the storm sewer is to be installed less than 10' deep within private property, the easement shall be a minimum of 20' wide with the pipe centered in the easement. If the storm sewer is 10' deep or greater, then the easement shall be twice as wide as the depth or as required by the City.
- 3.19 Show or define access routes for maintenance purposes to all manholes outside the public right-of-way and inlets or outlets at ponding areas (8% maximum grade, 2% cross slope, and 10' wide). Access easements shall be dedicated at the time of final platting to provide this access.
- 3.20 Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles.
- 3.21 In the development of any subdivision or ponding area, the developer and/or property owner is responsible for the removal of all significant vegetation (trees, stumps, brush, debris, etc.) from any



and all areas which would be inundated by the designated controlled normal water elevation (NWL) of any required ponding easement as well as the removal of all dead trees, vegetation, etc., to the high water level (HWL) of the pond.

- 3.22 The developer and/or engineer upon the completion of the construction of a designated ponding area is required to submit an as-built record plan of the ponding area certifying that the pond constructed meets all design parameters as set forth in the City's respective Storm Water Management Plans.
- 3.23 Utilization of existing wetlands for storm water management is subject to review by the appropriate regulatory agency in accordance with the "Wetlands Conservation Act".
- 3.24 Outlet control structures from ponding areas are required as directed by the City. Location and appearance of outlet structures shall be subject to City approval and may require landscape screening.
- 3.25 Storm water detention facilities constructed in the City of Oak Grove shall be designed according to the standards reflected in the current edition of the MPCA publication "Protecting Water Quality in Urban Areas", (Best Management Practices) and the design criteria from the National Urban Runoff Program.
- 3.26 The Developer shall over-excavate the bottom of the water quality ponds to compensate for erosion that will occur. The Developer will be responsible for verifying, at the end of the Warranty Period, that the ponds are providing the required volume.
- 3.27 Restrict clearing and grading within 16.5 feet of an existing wetland boundary to provide for a protective buffer strip of natural vegetation.
- 3.28 Site dewatering. Water pumped from the site shall be treated by temporary sedimentation basins, grit chambers, sand filters, upflow chambers, hydro-cyclones, swirl concentrators or other controls as appropriate. Water may not be discharged in a manner that causes erosion or flooding of the site or receiving channels or a wetland.
- 3.29 Waste and material disposal. All waste and unused building materials (including garbage, debris, cleaning wastes, wastewater, toxic materials or hazardous materials) shall be properly disposed of off-site and not allowed to be carried by runoff into a receiving channel or storm sewer system.
- 3.30 Tracking. Each site shall have graveled roads, access drives and parking areas of sufficient width and length to prevent sediment from being tracked onto public or private roadways. Any sediment reaching a public or private road shall be removed by street cleaning (not flushing) before the end of each workday.
- 3.31 Drain inlet protection. All storm drain inlets shall be protected during construction until control measures are in place with a straw bale, silt fence or equivalent barrier meeting accepted design criteria, standards and specifications contained in the MPCA publication Protecting Water Quality in Urban Areas.



- 3.32 Steep slopes. No land disturbing or development activities shall be allowed on slopes of 18 percent or more.
- 3.33 Catch basins. All newly installed and rehabilitated catch basins shall be provided with a sump area for the collection of coarse-grained material. Such basins shall be cleaned when they are half filled with material.
- 3.34 Drain leaders. All newly constructed and reconstructed buildings will route drain leaders to pervious areas wherein the runoff can be allowed to infiltrate. The flow rate of water exiting the leaders shall be controlled so no erosion occurs in the pervious areas.
- 3.35 Models/methodologies/computations. Hydrologic models and design methodologies used for the determination of runoff and analysis of stormwater management structures shall be approved by the director of public works and shall be based on Technical Release 20 (TR-20) or Technical Release 55 (TR-55). Plans, specification and computations for stormwater management facilities submitted for review shall be sealed and signed by a registered professional engineer. All computations shall appear on the plans submitted for review, unless otherwise approved by the city engineer.
- 3.36 Watershed management plans/groundwater *management plans*. Stormwater management plans shall be consistent with adopted watershed management plans and groundwater management plans prepared in accordance with Minn. Stats. §§ 103B.231 and 103B.255, respectively, and as approved by the state board of water and soil resources in accordance with state law.
- 3.37 Easements. If a stormwater management plan involves direction of some or all runoff off the site, the city may require the applicant to obtain from adjacent property owners any necessary easements or other property interests concerning flowage of water.
- 3.38 Marking. The city may require stormwater plan elements to be marked with signs or other methods of identification to ensure that the plan elements are not altered to impair effectiveness.
- 3.39 Unimproved land area. Except for driveways, sidewalks, patios, areas occupied by structures or areas that have been improved by landscaping, all areas shall be covered by plants or vegetative growth.
- 3.40 Design standards. Stormwater retention facilities constructed in the city shall be designed according to the most current technology as reflected in the MPCA publication Minnesota Stormwater Manual and shall contain, at a minimum, a permanent pond volume equal to or greater than the runoff from a two-inch rainfall for the fully-developed site.
- A. A minimum protective shelf extending ten feet into the permanent pool with a slope of 10:1, or 6:1 if approved by the City Engineer in cases where a non-vegetated water surface is desired, beyond which slopes should not exceed 3:1;
 - B. A protective buffer strip of vegetation surrounding the permanent pool at a minimum width of 25 feet. This width is consistent with the rules adopted by the board of water and soil resources under the Wetland Conservation Act of 1991 and amended August 3, 2009;

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- C. All stormwater retention facilities shall have a device to keep oil, grease, and other floatable material from moving downstream as a result of normal operations;
 - D. If required by the city to improve function of the facility, stormwater retention facilities must have a forebay to remove coarse-grained particles prior to discharge into a watercourse or storage basin.
- 3.41 Stormwater management criteria for permanent facilities. An applicant shall install or construct, on or for the proposed land disturbing or development activity, all stormwater management facilities necessary to manage increased runoff so that the two-year, ten-year, and 100-year storm peak discharge rates existing before the proposed development shall not be increased and accelerated channel erosion will not occur as a result of the proposed land disturbing or development activity. An applicant may also make an in-kind or monetary contribution to the development and maintenance of community stormwater management facilities designed to serve multiple land disturbing and development activities undertaken by one or more persons, including the applicant.
- 3.42 Stormwater Management shall require the use of any combination of BMPs, with highest preference given to Green Infrastructure techniques and practices (e.g., infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs, etc.), necessary to meet the following conditions on the site of a construction activity to the Maximum Extent Practicable (MEP).
- A. For new development projects – no net increase from pre-project conditions (on an annual average basis) of:
 - 1. Stormwater discharge Volume
 - 2. Stormwater discharges of Total Suspended Solids (TSS)
 - 3. Stormwater discharges of Total Phosphorus (TP)
 - B. For redevelopment projects – a net reduction from pre-project conditions (on an annual average basis) of:
 - 1. Stormwater discharge Volume
 - 2. Stormwater discharges of TSS
 - 3. Stormwater discharges of TP
 - C. New development Sites: Retain a runoff volume equal to one inch times the area of the proposed increase of impervious surfaces on-site:

Design and construct stormwater management practices that manage rainfall on-site, and prevent the off-site discharge of the precipitation from the first one inch of runoff from the new impervious surfaces created by the project. Discharge volume reduction can be achieved by engineered infiltration, canopy interception, soil amendments, evaporation, rainfall harvesting, and/or evapotranspiration and any combination of the aforementioned practices. This first one inch of rainfall must be 100% managed with no discharge to surface water.

Where re-use of stormwater is implemented, such as use with an irrigation system, volumes captured shall be given equal credit toward the volume reduction requirement by the City. All re-use measures must be fully documented in the post-construction stormwater management program maintained by the City.

D. **Redevelopment Sites:**

For redevelopment projects, the MS4 Permit requires a net reduction in the amount of TP, TSS and stormwater runoff volume (unless precluded by one of the prohibitions or restrictions listed below) leaving the site as compared with pre-project conditions. Most redevelopment projects contain both impervious and pervious land cover. Impervious cover types include pavement, buildings, gravel, stockpiles and other types of highly impacted cover in which the native hydrology has been greatly altered. The MS4 Permit defines any site with less than 15% of existing impervious surfaces prior to the commencement of construction activity as new development and the new development treatment conditions would apply as if the site had no impervious surfaces prior to construction. The percentage of impervious cover is calculated by dividing the area of the existing impervious cover by the limits of disturbance of the construction activities, not by the size of the property itself

For redevelopment projects (those with more than 15% impervious surface prior to construction) where the project proposer intends to add more impervious surfaces, the new development treatment requirements must be applied to the net increase of impervious surfaces. Additional treatment must also be included to reduce the volume (unless precluded by the limits or exceptions listed below), TP and TSS loads from the existing impervious surfaces.

E. **Linear Projects:**

For linear projects, the water quality volume must be calculated as the larger of one-inch times the new impervious surface or one-half inch times the sum of the new and the fully reconstructed impervious surface. Where the entire water quality volume cannot be treated within the existing right-of-way, a reasonable attempt to obtain additional right-of-way, easement, or other permission to treat the stormwater during the project planning process must be made. Volume reduction practices must be considered first. Volume reduction practices are not required if the practices cannot be provided cost effectively. If additional right-of-way, easements, or other permission cannot be obtained, owners of construction activity must maximize the treatment of the water quality volume prior to discharge from the MS4.

Comment [JD3]: Text added to satisfy MS4 permit requirement 20.7



3.43 Stormwater management prohibitions and restrictions. An applicant shall install or construct, on or for the proposed land disturbing or development activity, all stormwater management facilities necessary to manage increased runoff so that the two-year, ten-year, and 100-year storm peak discharge rates existing before the proposed development shall not be increased and accelerated channel erosion will not occur as a result of the proposed land disturbing or development activity. An applicant may also make an in-kind or monetary contribution to the development and maintenance of community stormwater management facilities designed to serve multiple land disturbing and development activities undertaken by one or more persons, including the applicant.

A key component of maintaining the volume of stormwater leaving a site is practices that allow infiltration to groundwater. For most sites, meeting the volume reduction requirement will require the use of infiltration. However, there can often be physical site constraints that limit the effectiveness of an infiltration system or site conditions in which stormwater infiltration must be prohibited. If construction activity is proposed on a site that meets one of the prohibitions or restrictions listed below, runoff from the limiting areas may be excluded from meeting the full volume reduction component of the MS4 permit. However, the full treatment standard for TSS and TP must still be met on-site or mitigated for off-site.

3.44 Infiltration prohibitions. The use of infiltration as a stormwater treatment method is prohibited as follows:

- 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.

3.45 Infiltration restrictions. The City shall restrict the use of infiltration techniques without a detailed engineering review, to prevent adverse impacts to groundwater, when the infiltration device will receive discharges from, or be constructed in

- A. Areas of predominately Hydrologic Soil Group D (clay) soils
- B. Areas within 1,000 feet up-gradient, or within 100 feet down-gradient of active karst features.
- C. Areas within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R.4720.5100, subp. 13.
- D. Areas where soil infiltration rates are more than 8.3 inches per hour.

The restrictions above do not preclude proposers of construction activity from infiltrating stormwater. Rather, the restrictions simply require that a higher level of design and review is needed. There may be opportunities to infiltrate in these areas and not impact groundwater or experience a system failure because of one of the site restrictions.

Exception for meeting the volume control standard. A lesser volume reduction requirement than required if the project meets one of the prohibitions or restrictions listed above and if the owner or operator of the construction activity implements to the Maximum Extent Practicable (MEP) other

volume reduction techniques such as evapotranspiration, reuse/harvesting, conservation design, green roofs, etc. on site. If other volume reduction techniques are not used, documentation must be provided on why that decision was made and maintained on file at the City.

- 3.46 Mitigation provisions. Mitigation provisions are allowed when owners and operators of a construction activity cannot meet the TSS and/or TP reduction requirements on the site of the original construction activity. The mitigation provisions of the Regulatory Mechanism(s) shall ensure that any stormwater discharges of TSS or TP not addressed on the site of the original construction activity are addressed through mitigation and, at a minimum, shall ensure the following mitigation requirements are met.

Mitigation project areas are selected in the following order of preference:

- A. Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
- B. Locations within the same Department of Natural Resource (DNR) catchment area as the original construction activity.
- C. Locations in the next adjacent DNR catchment area up-stream.
- D. Locations anywhere within the permittee’s jurisdiction.

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 already required by this permit cannot be used to meet mitigation requirements.

Mitigation projects shall be completed within 24 months after the start of the original construction activity.

The City shall determine, and document, who is responsible for long-term maintenance on all mitigation projects.

If the City receives payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the conditions for post-construction stormwater management. The City shall apply any such payment received to a public stormwater project. **Lastly, the City must document all payments received for off – site treatment areas as well as all correspondence and justifications associated with the payment.**

Comment [JD4]: Text added to satisfy permit item 20.20

The City must identify priority areas within the various watersheds of its jurisdiction where mitigation projects could occur. If the owner of a construction activity cannot meet the TSS and TP requirements because of site limitations, they may either perform a mitigation project or make an in- lieu-of payment to the City to apply to a mitigation project at a later time.

The City must document all approved and authorized off – site treatment areas as part of the site plan review process. Additionally, the City must document the rationale for authorizing the off – site

Comment [JD5]: Text added to satisfy permit item 20.20



treatment area as well as all correspondence and justifications.

**SECTION FOUR:
SANITARY SEWER**

All sanitary sewer and appurtenances shall be checked for conformance with the design criteria specified in the Recommended Standards for Waste Water Facilities - 2014 Edition of the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers (10 State Standards) or most recent edition and as modified herein.

The following are specific requirements related to the design of sanitary sewer:

- 4.1. Permits: The Developer shall obtain all regulatory agency permits and approvals including those from the Minnesota Pollution Control Agency and Metropolitan Council prior to beginning of construction.
- 4.2 The number of people per dwelling units used in design calculations shall be approved by the City.
- 4.3 Determination of sanitary sewer services size and design shall be done in accordance with the Department of Health, Minnesota Plumbing Code, and Minnesota Rules Chapter 4715.
- 4.4 Design calculations for determining the size of all sanitary sewer mains and for service stubs to building dwellings with fixture unit value greater than 180 shall be submitted with preliminary plans.
- 4.5 Manholes:
 - A. Manholes shall be placed on street centerline to the greatest extent possible, other locations outside the wheel paths (3' and 9' off centerline) may be allowed with City approval. Manholes outside of roadways shall be marked with a sign.
 - B. Drop Manholes: Drop manholes are required when the pipe inverts are greater than 2 feet apart. Only outside drops are allowed.
 - C. Ponding/Drainage Conflicts: No manhole shall be located within a designated ponding/flowage easement without City approval. If such location is unavoidable, then the structure may be required to be built to a higher elevation to avoid flooding, constructed to tolerate frost action, and shall be made of water-tight materials. The City requires that manholes located in possible flooding areas will require a manhole chimney seal.
 - D. Spacing: The maximum spacing between manholes is 400'. Manhole steps will be aligned and over the downstream side of the manhole. Steps within manholes will be:
 - 1" +/- Horizontal Alignment
 - 1" +/- Vertical Alignment with 16" spacing as the standard
 - E. Stub Lines: Manholes are required on the terminus end of all stubs if the line will be active.
 - F. Seals: The City requires chimney seals on all manholes.
 - G. Connections to existing structures: Any connections to existing manholes shall be core drilled and attached to the manhole with a rubber boot, or as approved by the supplier. If the pipe diameters of the existing and proposed pipes are the same, then the invert elevations shall drop



0.10 feet through the manhole. If the pipe diameter is different, then the 8/10ths line of the two pipes shall match at the manhole.

4.6 Parallel Utilities: Maintain a minimum of 10’ of horizontal separation between sanitary sewer and watermain.

4.7 Minimum Slopes: The minimum slopes for sanitary sewer shall be as follows:

Size of Pipe	Minimum Slope
8 inch	0.40%
10 inch	0.28%
12 inch	0.22%
15 inch	0.15%

4.8 Utility Crossings: Show on the plans the existing and proposed sanitary sewer in plan and profile view, along with other existing and proposed utilities in the construction zone.

4.9 Along deep trunk sanitary sewers (greater than 20’ deep) the City may require Developer to construct a parallel, shallow sanitary sewer for service connection. The shallow sanitary sewer would eliminate the need for deep risers that connect to the trunk sanitary sewer.

4.10 Easements: If the sanitary sewer is to be installed less than 10’ deep within private property, the easement shall be a minimum of 20’ wide with the pipe centered in the easement. If the sanitary sewer is 10’ deep or greater, than the easement shall be at least twice as wide as the depth or as required by the City.

4.11 Trunk sanitary sewers shall be designed to promote a laminar flow through the sewer system. Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles.

4.12 A manhole is required at the property line/easement line in Commercial/Industrial areas where service connection to the City system is made. These manholes will serve as an inspection or monitoring manhole.

4.13 Sanitary Sewer Materials: The following pipe types and class are identified in general with respect to depths with soil type verification and design criteria required to substantiate size and type of pipe used.

Size	Depth	Type & Class
8” to 10”	8’ to 16’	PVC, SDR 35
8” to 10”	16’ to 26’	PVC, SDR 26
8” to 10”	26’ to 40’	DIP, CLASS 52
8” to 10”	Over 40’	DIP, CLASS 53



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- 4.14 Testing: Deflection testing for all non-rigid pipes shall be conducted after the final backfill has been in place for 30 days. All sewer lines shall be air tested and televised.
- 4.15 Pressure sewers will be considered on a per project basis. The use of pressure sewers may not be allowed if the use of conventional gravity sewers are determined to be practical in the opinion of the City.
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SECTION FIVE:
WATERMAIN DESIGN STANDARDS

All distribution system design for water works shall be checked for conformance with the design criteria specified in the Recommended Standards for Water Works by the Great Lakes - Upper Mississippi River Board of State Sanitary Engineers - 2012 Edition or most recent edition and as modified herein.

The following are specific requirements related to the design of watermains:

- 5.1 Pipe Size: Minimum watermain size shall be 6".
- 5.2 Permits: The developer is responsible for obtaining all necessary regulatory agency permits and approvals including that of the Minnesota Department of Health.
- 5.3 Depth: For all watermains the depth of cover shall be a minimum of 8' to top of pipe and maximum of 10' of cover. Also 10' of horizontal separation shall be provided from other parallel utility alignments.
- 5.4 Materials: Materials shall be PVC C-900 or ductile iron pipe Class 52 for 5" to 12" diameter watermain. Materials for fittings shall be ductile iron. The materials for watermains over 12" shall be ductile iron Class 51, or as determined by the City Engineer.
- 5.5 Hydrants: Hydrant spacing shall provide a hydrant within 250 feet of the extent of each building envelop. Locate hydrants at all intersections, if practical. Hydrants not located at an intersection shall be located at a property line.
- 5.6 Design calculations for sizing of all watermains shall be submitted with preliminary plan submittal. Sizing shall provide a minimum fire flow capacity of 1000 gallons per minute with a residual pressure of 20 psi.
- 5.7 Gate Valves: Locate gate valves within street surface where possible and at right-of-way line extended. When intersection spacing exceeds 1000', then a mid-block gate valve will be required. All valves shall be gate resilient seal valves.
- 5.8 Utility Crossings: Show on plans the existing and proposed watermain in plan and profile view along with other existing and proposed utilities in the construction zone. Provide a minimum of 18" vertical separation for all watermain crossings with sanitary and storm sewer. Also, other utilities that cross the watermain shall cross at a 90-degree angle, if possible, with the minimum requirement of a 45-degree angle for the crossing.
- 5.9 Water System Operation: City personnel shall perform activation of the watermain system only.
- 5.10 Dead-end Mains: Dead-end lines shall be minimized by looping of all mains wherever practical. Where dead-end mains occur a hydrant shall be installed at or near the end of the main for flushing purposes. The hydrant shall be located behind the curb on stub streets to allow the City's snowplow



crews to pile snow on the end of the stub street. All temporary and permanent dead-ends shall be secured with a gate valve at least 40' from the plugged end.

- 5.11 Easements: If the watermain is to be installed within private property, the easement shall be a minimum of 20' wide with the watermain centered in the easement. The City will maintain all watermains in public ROW and dedicated easements. The private property owners will maintain their own laterals, services, and appurtenances from the ROW or easement line or from the gate valve or curb box of such line servicing private property.
- 5.12 Signage: Hydrant flags are required. The Developer shall furnish and install the Hydrafinder high-visibility locating device, Rodon, Inc., or approved equal on each hydrant to be included in the contract price bid for hydrant. Contractor shall also supply an extra Hydrafinder to be delivered to city shop. One extra 4' gate valve key, curb box key and hydrant wrench per development are required.
- 5.13 Alignment: Watermains, laterals, and/or services shall not be located within any defined or designated ponding easement.
- 5.14 Conductivity straps will be installed and tested when DIP watermain is installed. Tracer wire will be installed and tested when PVC watermain is installed.

SECTION SIX:
STREET LIGHTING

- 6.1 Street Light Policy: Residential street lighting shall conform to the guidelines within this manual. Streetlights shall be placed at all intersections with Municipal State Aid Streets, County Roads, County State Aid Highways, and State Trunk Highways. When the City constructs improvements to City Streets, the street lighting shall be brought up to this standard.
- 6.2 New Subdivision Requirements: In new subdivisions, developers shall:
 - A. Install streetlights at all intersections of residential streets with streets as listed in 6.1 above.
 - B. Pay the full capital cost of every light to be installed.
 - C. Pay the operation and maintenance for the project's street lighting system until the City accepts the project.
- 6.3 Optional Street Lights: The City recognizes that developers may want to install streetlights within a new development that exceed the minimum requirements of 6.1 and 6.2 above. Should a developer choose to install optional street lights, the developer shall:
 - A. Pay the full capital cost of every optional light to be installed.
 - B. Pay the operation, maintenance and future capital replacement costs of the optional lights until such time there are enough occupied homes within the development for these costs to be paid for by the residents of the development as billed by the City.
 - C. The Developer may choose to pay the charges until such time there are enough occupied homes to distribute the charges. Should the Developer choose not to pay the charges, the



optional lights shall not be energized until a majority of the homes within the development are occupied and charged the costs.

- 6.4 All street lights and all street lighting plans require approval of the City Engineer's office.

SECTION SEVEN:
SANITARY SEWER AND WATERMAIN SERVICES

- 7.1 Size: Service lines shall be sized in accordance with the Department of Health, Minnesota Plumbing Code – Minnesota Rules Chapter 4715. Minimum size for water services shall be one inch nominal inside diameter.
- 7.2 Pressure: Pressure sewer services shall be constructed in accordance with the system requirements. Connections shall be per manufacturer specifications. The City shall witness pressure sewer installation. The pressure sewer services on the system that discharges to the West Lake George Treatment system shall comply with the requirements specified in the NE Sewer System, Lift Station Operation and Maintenance Manual.
- 7.3 Depth: The maximum depth of the sanitary sewer service at the ROW line shall be 10' unless documented by a proposed house or building elevation that justifies a deeper service.
- 7.4 Testing: The sewer and water service shall be included in the pressure and leakage testing requirements for the main lines.
- 7.5 Grade: Minimum grade for sanitary service stubs shall be 1/4" per foot (2%).
- 7.6 Materials: Sanitary sewer services shall be constructed with 4" or 6" PVC SDR 26 from main line sewer to the 45-degree bend when D.I.P. is used for the main line sewer itself. The City requires all services with risers to be televised.
- 7.7 Right-of-Way: Developers are responsible for constructing the services to 10' beyond the ROW line where topography permits.
- 7.8 Cleanouts: Cleanouts are required at 100' intervals including the riser on sanitary sewer services. All sanitary sewer cleanouts constructed in paved areas require the installation of a meter box and cover for ease of access to the clean out.
- 7.9 Connections: Sewer services shall be connected to a wye on the main and shall not be constructed into manholes unless approved by the City. Approved connections to a manhole requires a KOR-N-SEAL connection or approved equal and must match the manhole invert.
- 7.10 Amendments to Minnesota State Statutes 216.D became in effect on January 1, 2006 that will require more comprehensive information be given to excavators when Gopher One locating requests are made. In accordance with these statutes, the City will be requiring additional procedures/measures take place during installation of all public utilities within the Rights-of Way and easements. All service



laterals (Sanitary sewer, water and storm sewer) installed after January 1, 2006, must have a “locating wire or equally effective means” of marking the location of the service lateral.

SECTION EIGHT:
SPECIAL CONDITIONS (TECHNICAL)

Watermain, sanitary sewer, storm sewer and streets construction specifications in the City of Oak Grove.

8.1 General: Construction of sewers and watermain including trench excavation, backfill and restoration work shall be performed in accordance with the “Standard Specifications” as prepared by the City Engineers Association of Minnesota, current edition, except as modified herein.

Street construction including subgrade preparation, base work, curbing, pavement work, and boulevard restoration shall be performed in accordance with Divisions 2 and 3 of the Minnesota Department of Transportation (MnDOT) “Standard Specifications for Construction” current edition, and any amendments thereto or latest revision and as modified herein.

8.2 Street and Driveway Restoration: All existing streets, alleys, shoulders, driveways, sidewalks, medians, etc. disturbed by construction shall be replaced or restored to a condition equal to or better than existing conditions in accordance with the specifications contained herein unless modified by the Special Provisions. Payment for such restoration shall be considered incidental to the Contract Bid Item. Any improvements removed or damaged unnecessarily shall be replaced or repaired as directed by the City Engineer at the Contractor’s expense.

8.3 Dust Control: Dust control is the responsibility of the contractor, and must be done at the request of the City or their representatives. Water cannot be taken from an unmetered hydrant, unless permission is granted by the Public Works Supervisor.

8.4 Amendments: The following amendments are additions to the provisions of the above-referenced specifications:

The numbering system used in the following section corresponds to the numbering system in the above identified specifications.

2600 TRENCH EXCAVATION AND BACKFILL/SURFACE PREPARATION

2600.3 CONSTRUCTION REQUIREMENTS

A. **Establishing Line and Grade:** The Contractor shall give the Engineer forty-eight (48) hours’ notice; 2 working days, for the establishment of line and grade, so the Engineer may have time to provide them. After the Engineer has provided line and grade, the Contractor shall be held responsible for the protection and preservation until authorized to remove them by the Inspector. The Contractor shall bear the full cost of replacement that may be caused by their

unauthorized removal. The Engineer may require that work be suspended at any time and for any reason when such marks cannot be properly followed.

No additional compensation shall be allowed the Contractor for any claims of crews being held up because of lack of line and grade stakes.

- B. **Excavation Limitations and Requirements** All trenches shall be excavated so that the pipe may be laid accurately to grade with a minimum of 8 feet of cover over the watermain, unless otherwise noted on the plans. The maximum trench width for sanitary sewer shall be 2' greater than the outside diameter measured 1' above the top of pipe unless otherwise approved by the Engineer.
- C. **Preparation and Maintenance of Foundations:** The Earth Foundation Bedding Method as shown in the standard details shall be used for all pipe installation where ground water or unstable material does not create a problem. Foundation preparations shall be conducted as necessary to produce a stable foundation and provide continuous and uniform pipe bearing between bell holes. The bedding shall consist of shaping the foundation material to closely fit the lower part of the pipe to a depth of at least fifteen percent of the outside diameter of the pipe. Where, in the opinion of the Engineer, unstable material prevents use of this bedding, and then the Contractor shall install Granular Bedding or Trench Stabilization Material.
- D. **Pipeline Backfilling Operations**
Backfilling shall be done in lifts or uniform layers not to exceed the depth as outlined herein and each lift shall be completely compacted over the full width of the excavated area. Three feet of material over the top of the pipe shall be required before a vibratory or sheep's foot roller may be used.

Within the pipe bedding and encasement zones described as that portion of the trench which is below an elevation and one foot above the top of the pipe, backfilling shall be done as per MnDOT Specification 2451.3D. The depth of lifts shall be 8" or less (loose measurement) and compacted to 95% of the standard proctor density ASTM: D698 (Method A.)

All other backfilling shall conform to the requirements as per MnDOT Specification 2105. The maximum lift requirement below the upper 3 feet shall be 12" (loose measurement) except under the conditions outlined in MnDOT Specification 2105.3E and compaction to 95% of the standard proctor density. The upper 3 feet of backfill shall have maximum lifts of 8" (loose measurement) and compaction 100% of the standard proctor, ASTM:D698 (Method A).

When the trench excavation is within the right-of-way of a City street, or State or County Highway, the backfilling of the trench, compaction of materials, subgrade preparation and surfacing shall be done in strict accordance with the requirements and specifications of the inspecting agency.



Special compaction effort shall be done around all manholes, valve boxes, curb boxes and other structures by mechanical methods acceptable to the Engineer and per the requirements of MnDOT Specification 2451.3D.

In the event that suitable, natural material is not encountered during the normal excavation for pipes and structures, or when the material encountered is determined unsuitable by the Engineer for backfilling around pipe or structure as required herein, the contractor shall provide and place such approved material. The Engineer shall verify all quantities of such material used.

Hydrant leads and service trenches must be compacted in the same manner as the watermain trenches. They shall not be left open overnight. In areas where curb and gutter exists, sufficient curbing shall be removed to allow this compaction over the entire disturbed area.

If backfill material is too wet to obtain specified compaction densities, the material shall be dried or allowed to dry to the limits described in MnDOT Specification 2105 or replaced with suitable material at no additional compensation.

All deficiencies in the quantity of material for backfilling the trenches or for filling depressions caused by settlement shall be supplied by the Contractor. Excess material shall be hauled away where directed by the Engineer at no additional compensation.

No waste materials or debris shall be deposited on the project site without the written permission of the Engineer. Waste material and debris shall include, but not be limited to, trees, stumps, pieces of pipe, and pieces of concrete, pieces of asphaltic concrete, tin cans or other waste material from the construction operations. All disposal areas shall be leveled off and the areas shall have approximately one foot of clean fill material on the top, all at no additional compensation.

The Contractor shall remedy at its own expense any defects that appear in the backfill for a period of one year after the Final Acceptance Date.

If the Contractor uses PVC sewer pipe and suitable, natural granular material is not encountered during the normal excavation for the sewer trench or when the material encountered, is determined unsuitable by the Engineer for backfilling around the pipe, the Contractor shall provide and place such material as approved by the Engineer (sand fill). Bedding requirements shall include mechanical compaction of sand material surrounding the pipe to at least 95% of maximum density as described in ASTM Methods D-698 to prevent deflection of the pipe cross-section.

Deflections greater than 5% of the inside pipe diameter shall be considered failure of the bedding procedure and the Contractor may be required to re-excavate the trench and provide additional compaction along the side of the sewer pipe.

Density testing shall be performed by a MnDOT certified testing technician by an approved testing laboratory at locations to be determined by the Engineer. The Contractor shall bear all

cost of any re-testing as a result of test failures. A minimum testing frequency of soil compaction for watermain and service trenches shall be one test per 500' length of pipe per 3' depth of backfill compacted beginning at the pipe bedding level to finish subgrade elevation. Testing frequency for structures such as gate valves in the roadway area shall be one test per every third structure per 3' depth of backfill compacted beginning at the base support depth to finish subgrade and within 12" of the outer edge of structures. Test location shall be at the bottom 1/3 of the lift.

Any failing compaction test shall require two passing re-tests. For watermain and service trenches, one re-test shall be taken near the failure test and one taken at the same backfill depth within 250' of the failure test. For structures, only one re-test shall be at the location of failure and one taken at an adjacent structure and at a similar depth as the failure test. Exact locations will be determined by the Engineer. Any excavation required to perform the testing requirements as outlined above as well as replacing the backfill and compacting shall be done at no additional compensation to the Contractor.

In addition to the minimum testing frequency requirements, at the start of backfilling and compacting operations, the Engineer shall utilize a testing company to determine the number of passes needed for achieving the specific density for the mechanical equipment to be used in the compaction operation. Additional information noted shall be the soil type being compacted, moisture content of soil, travel speed of equipment and lift thickness (loose measurement). This information shall be forwarded to the City Engineer and the Contractor and shall be used only as a guide in determining the compactive effort needed to achieve the specified density of the material being completed. This procedure shall not constitute acceptance for any backfill placement. The Contractor shall assist the Engineer in this procedure at no additional compensation. Further testing of this nature may be required when different soil types are encountered or as the Engineer directs.

Testing shall be performed during the progression of construction and backfilling operations in order to assure acceptable construction practices. Going back and digging test holes is to be avoided.

2611 WATER DISTRIBUTION

2611.2 MATERIALS

The Certificate of Compliance shall in no way relieve the Contractor of any responsibilities to the Owner as to the quality of the materials furnished and installed.

- A. Water Pipe Materials:** All pipe furnished for watermain and branch line installations shall be polyvinyl chloride (PVC). Wherever connection of dissimilar materials or designs is required, the method of joining and any special fittings employed shall be subject to the approval of the Engineer. Tracer Wire shall be eight gauge single strand wire with plastic jacket, type TW or THW. In line splices shall be compression butt splices with 3M cast kit. Wire nuts shall not be allowed. The maximum spacing between tracer wire connection points shall be 500 feet. Tracer wire on lengths of pipe without hydrants or valves or that cannot meet the 500' spacing

requirement shall have wire terminal connection points through the use of a terminal box. The top lid shall be cast iron, suitable for flush burial, with integral stainless steel terminals and a locking lid opened with a standard pentagon key. The bottom section shall be a minimum 12" ABS tube. The tracer wire access box shall be Valvco Pipe Tracer Wire Terminal Box or approved equal.

- A. **Cast Iron and Ductile Iron Pipe Fittings:** Water main pipe shall be PVC C-900 or Class 52 for 6", and 8" and 12" diameter and Class 51 for 12" diameter and any pipe larger. Fittings shall be Class 250. If PVC water main is installed, a tracer wire must also be installed. All bolts shall be "core-blue".
- C. **Fire Hydrants:** Hydrants shall be Waterous Pacer WB67-250 Traffic type and shall be in accordance with the Standard (American Water Works Association) Specifications C-502 latest revision. Hydrant hose connections shall be National Standard Thread. All nozzle covers shall be pentagonal nut caps. The hydrants shall have two, 2 1/2" hose connections (thread size 3 2/32" O. D. 701.2 T.P.I.) and one 4 1/2" pumper connection (thread size 5 24/32" O.D. 701.2 T.P.I.). The hydrants shall be furnished with a 16" traffic section (24" from ground line to centerline of nozzle).

All hydrants shall have a six-inch mechanical joint inlet for connecting to a six-inch ductile iron lead from the main. There shall be a gate valve between the hydrant and the watermain or lateral. Hydrant bury length shall be 8'6" with heavy duty operating rod. The hydrants shall have all working parts of bronze and shall be designed for 250-psi working pressure and 300-psi hydrostatic pressure.

All hydrants shall be given one additional coat of paint after installation. All abraded surfaces shall be cleaned and primed red prior to application of the final field coat. Paint shall be as recommended by the hydrant manufacturer as compatible with the shop coating.

All hydrants shall be affixed with a "5' Hydralfinder marker" or approved equal. Contractor shall also supply an extra Hydralfinder to be delivered to the city shop City Maintenance Building.

- D. **Valve Housings: Valve Boxes:** Valve boxes shall be Tyler No. 6860 Series "G" or approved equal, screw type for 5 1/4" shaft, cast iron, American made, cover marked with "Water". Box to be adjustable a minimum of 6" up and down from the specified depth of pipe bury.
- E. **Gate Valves:** All valves shown on the drawings less than 12" in size shall be compression resilient seated gate valves in accordance with the AWWA C-509 specification latest revision. Valves shall be either American or approved equal. Valves shall have "O-Ring" construction and be designed for 200 psi working pressure. Valves 12" and larger shall be butterfly valves.
- F. **Water Service Pipe and Fittings:**
 - 1. Copper pipe shall be Type K copper tubing, ASTM B88, and shall conform to 12 the sizing requirements of ANSI/AWWA C800.

2. Corporation Stops: Corporation stops shall be ball valve Ford FB 600 bell style or approved equal. They shall be full size inlet and outlet for the respective services.

3. Curb Stops and Boxes: Curb stops shall be ball valve Ford B22-444M or approved equal. Curb stops shall have an AWWA, copper service pipe inlets and outlets.

Curb boxes shall be Ford EMZ-80-56 with stationary rod and #5614-L lid or approved equal for 1 inch services complete with foot piece and 1 1/4 inch stack, adjustable up and down for 7.5 feet of cover.

For 1 1/2 inch and 2-inch services, the curb box shall be Ford EMZ-8-57 with stationary rod and lid or approved equal.

4. High Density Polyethylene Pipe (HDPE) shall meet the requirements of 14 ASTM D2239 or D3035 and shall have a minimum working pressure of 160 15 psi.

5. High Density Polyethylene (HDPE) water services

- Curb stops shall be Mueller Mark II Oriseal with threaded connections
- Threaded stainless steel by HPDE transition fittings shall be supplied for each curb stop. Transition fittings shall be butt fused to the service pipe. Transition fittings shall be manufactured by Central Plastics.

2611.3 WATERMAIN AND SERVICE INSTALLATION CONSTRUCTION REQUIREMENTS

A. **Blocking and Anchoring of Pipe:** At all valves to hydrants, valves to branch service lines and dead end lines, suitable restraining devices such as mega lugs or tie rods shall be required to resist movement as well as reaction backing. If tie rods are used, they shall be core-blue or stainless steel.

B. **Connection and Assembly of Joints:** Jointing of mechanical joint pipe, push-on joint pipe and fittings shall be done in accordance with AWWA Specification C600 Section 3.4 or latest revision. When pipes are cut in the field, the cut or straight end shall have all sharp or rough edges removed before assembly.

C. **Water Service Installations:**

The depth of cover for services shall be not less than 8.0 feet within the street right-of-way and not less than 7.5 feet within the drainage and utility easement areas.

Corporation stops shall be tapped into the main only when full of water under operating pressure. No taps shall be made into a dry pipe. Corporation stops shall be turned into the pipe until tight and shall not be turned back to facilitate having the operating nut on top.

Saddles are required on water services for 1" corporation connections to 6" ductile iron pipe watermain and on all PVC watermain.

The water services shall be installed as shown on the standard details. The curb stop and box shall be located on the drainage and utility easement line. The top of the curb box shall be set to proper grade with the extension at the mid-point. Pipe terminals at the easement line shall be marked on the ground surface with a suitable wood timber 4 by 4 inch, 6 to 8 feet long set vertically into the ground at least 4 feet, with the top 2 feet painted blue.

The copper service lines as placed between the watermains and the curb boxes shall have a minimum of 8.0 feet of cover in the street pavement area and 7.5 feet of cover in the boulevard area; therefore service lines must be placed (incidental to the project) beneath any obstruction which would prohibit the required cover if the service line was placed on top of said obstruction. The method of tunneling under an obstruction shall be approved by the Engineer. Gopher State one Call One requirements must be met.

D. Setting Valves, Hydrants, Fittings and Specials

Hydrants shall be installed per standard details and shall be supported upon a concrete base 18-inches square and a minimum of five inches thick. Each hydrant is to be restrained against movement with Mega-Lugs or tie rods. If tie rods are used, they shall be core-blue or stainless steel.

All hydrants shall be given one additional coat of paint after installation. All abraded surfaces shall be cleaned and primed prior to application of the final field coat. The City Engineer must approve paint.

Hydrant shall be supported to maintain their position and must not be knocked out of plumb during backfilling.

The position of the hydrant shall be set so that the nozzles are 24 inches above the finished ground elevation with a breakout flange 23 3/4" below the centerline of the nozzle.

All fittings, hydrants and valves shall be tied to the main line with 3/4 inch rods or acceptable retainer glands as shown in the standard details. The cost of the work is an incidental item and shall be merged with the various unit bid prices.

When a Gate Valve is placed out of a paved area, a marker sign shall be installed.

E. Disinfection of Watermains

Only fresh disinfectants shall be used and the main filled with water and flushed not later than one week after the disinfectant has been added. The chlorinated water shall be left in the pipe being disinfected, for a minimum of twenty-four (24) hours.

Testing and sampling must meet the requirements of AWWA C-651 and the Minnesota Department of Health. If any samples show the presence of more than one coliform organism per 100 milliliters. The disinfection and sampling procedures shall be repeated until this standard is met.

Provision shall be made for test samples to be taken from services, not fire hydrants. Samples must be taken by an approved technician from a City approved laboratory.

F. Electrical Conductivity Test

Electrical Conductivity Tests shall be performed per C.E.A.M. 2611.3 F. Trace Wire testing is required when PVC watermain is installed. Upon completion of the project the Contractor shall furnish a locator and using a low voltage circuit, test the entire wire system in the presence of the Engineer. The test shall consist of a continuous above ground trace of the piping and appurtenances installed. All areas failing the location test shall be corrected at the Contractor's expense.

G. Hydrostatic Testing of Watermains

After the pipe has been laid including fittings, valves, and hydrants and the line has been backfilled in accordance with these specifications, all newly laid pipe, or any valved section thereof, unless otherwise directed by the Engineer, shall be subjected to hydrostatic pressure of 150 pounds per square inch.

Each valved section of pipe shall be slowly filled with water. The specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The Contractor shall furnish pump, pipe connection, gauges and all-necessary apparatus. The gauge used for testing must be at least 4 1/5" in diameter and be approved by the Engineer. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevations, and afterward tightly plugged.

The duration of each such test shall be at least two hours with no pressure drop allowed.

Any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of the pressure test shall be removed and replaced by the Contractor with sound material in the manner provided and the test shall be repeated until satisfactory to City representatives.

The City does not guarantee that the existing gate valves will maintain the pressure test requirement. The Contractor shall be required to plug the newly installed line and separately test each segment of line installed. Additional gate valves shall not be installed to facilitate the

testing unless written permission is obtained from the City Engineer. All wet taps and/or cut-ins shall be tested separately and immediately prior to backfilling under normal city pressure.

H. Connection to Existing Facilities

Prior to connecting to existing watermains, the City's Public Works Superintendent must be notified. Any residents who will be affected by this shutting off water shall be given a minimum of 48-hour advance notice as to when and for how long service will be interrupted by the Contractor. The required notice forms are available through the Public Works Department.

Prior to connecting to existing watermains, the Contractor shall have all labor, materials and equipment ready to do the work to keep the shut-off time to a minimum. As soon as possible after making the connections, the Contractor shall flush and test the new main to prevent any contamination of the existing facilities. Only a representative from the City's Public Works Department shall operate any existing valves.

The City Engineer shall approve the materials and procedures to be used in the connection. The connection to existing system shall be inspected by the full time inspector and/or city inspectors and approved before backfilling said connection.

2621 SANITARY SEWER AND STORM SEWER INSTALLATION

2621.2 MATERIALS

The Certificate of Compliance shall in no way relieve the Contractor of any responsibilities as to the quality of materials furnished and installed.

- A. Ductile Iron Pipe (D.I.P.) and Ductile Iron and Gray Iron Fittings:** Service pipe shall be extra heavy cast iron soil pipe and fittings, which shall conform to A.S.T.M. A-74 and the dimensions, weights and markings, shall be in accordance with the ASA No. A40.a. Jointing material for extra heavy cast iron soil pipe shall be "Ty-Seal" rubber gaskets or approved equal.

B. Polyvinyl Chloride Pipe (PVC) and Fittings:

PVC pipe and fittings shall be made of plastic conforming to the requirements of ASTM D-1784 Class 1245B Rigid PVC. The minimum sidewall to diameter ratio shall be SDR-35 (heavy wall). If PVC pipe is used for services, SDR 26 is required.

Joints shall be either solvent cement (ASTM D-2564) or elastomeric gasket joints (ASTM D-1869). Gasket joints must be approved by the Engineer on the basis of data furnished by the manufacturer.

The Contractor shall furnish and place the necessary pipe bedding material as specified in ASTM D2321, recommended practice for underground installation of flexible thermoplastic sewer pipe 8", 10" or 12" and shall be paid for as part of the unit price bid for PVC pipe as shown on the Proposal Form.

C. Metal Sewer Castings

Manhole castings shall be Municipal Castings, Inc. No 301A Cover with two concealed pick holes and No. 3017-7 Frame with machined bearing surfaces or approved equal. Manhole castings shall be labeled with the words "SANITARY SEWER" or "STORM SEWER" whichever applies.

For locations in the street, Catch Basin Castings shall be Neenah No. R-3067-V (vane grate) or approved equal. For locations in the yard areas, castings shall be Neenah R-4342, stool type or equal.

D. Pre-cast Concrete Manholes and Catch Basin Sections

On the sanitary sewer, all connections to manholes shall be either of the Mini-Tee type, Reseal or KOR-N-SEAL gasketed type, or other approved watertight gasketed connections. Breaking out manhole sections for pipe connections in the field will not be permitted.

All manhole sections shall have the R-2 type confined O-ring gasket joints. Lift holes will not be allowed on pre-cast manholes.

When specifically permitted by the Engineer, Pre-cast segmental blocks may be used to build up manholes and/or catch basins. The blocks shall conform to ASTM C-139 and shall be radial to form an eight-inch wall thickness.

Riprap: The riprap stone and filter blanket materials shall conform to MnDOT 3601 specifications. Type and class of riprap and type of granular filter blanket shall be specified on the plans.

E. Location Wire/Tracer Wire

On PVC forcemain installations, a relocation wire shall be installed along the top of the pipe prior to backfilling. The wire shall be 12-gauge stranded wire with plastic jacket, type TW or THW. In-line splices shall be compression butt splices with 3M cast kit. Splicing shall not be more frequent than one per 250 feet of piping.

At each appurtenance such as air relief manhole or valve box, the wire shall be securely fastened to the metal box or fastened inside the manhole on an approved standoff (quick bolt) readily visible.

The wiring shall be connected to the appurtenance in such a way that a low voltage circuit can be completed without excavation of the structure.

2621.3 CONSTRUCTION REQUIREMENTS

A. Pipe Laying Operations: RCP bedding shall be as specified per MnDOT 2451.3C and flexible pipe shall have bedding per ASTM D 2321-Classes I, II, or III to support the anticipated load.

B. Sewer Service Installations

Risers are to be constructed as shown on standard details at all points of service where the depth of cover over the invert of the sewer is 12 feet or more, or as determined by the Engineer.



House services shall be kept to a minimum depth of 10 feet at the drainage utility easement line or as required to serve property per Engineer directions.

Service connections of the saddle type, when permitted by Engineer, shall be made in a smooth, round hole, machine drilled into the main sewer pipe. The fitting used in the connection shall be made in such a manner as to insure that no protrusion of the fitting into the main sewer pipe shall result. The connector shall fit perfectly the contour of the inside of the sanitary sewer and shall be specifically designed to fit the particular size main sewer pipe into which the connection is made. The machine-drilled hole shall be of such size to provide 1/8" clearance between the outside of the fitting and the hole. The space between the shoulder of the fitting and face of the main sewer pipe shall be 1/8" thick and this space shall also be completely filled with joint material.

The joint material used for the house service connection shall be completely waterproof and shall be capable of withstanding any condition of stress or strain likely to be encountered in normal sanitary sewer construction or maintenance. Concrete encasement will not be considered waterproof.

The fitting shall be manufactured of cast aluminum alloy or cast iron and shall be capable of receiving normally used types of pipes for house service connections. The Contractor shall be responsible to obtain pipe of proper dimensions to make a compatible water tight joint when used in conjunction with the fitting.

The drilling machine and fittings herein described shall be of the type manufactured by Ecodyne Corporation, Smith & Loveless Division, Lenexa, Kansas 66215, or the approved equal.

C. Manhole and Catch Basin Structures

All pipe entrances to sanitary sewer manholes shall be sealed watertight with a KOR-N-SEAL boot or approved equal.

Catch basins and catch basin manholes located on curb lines shall be set by the Contractor such that the concrete top section will be in alignment with the final adjusted position of the inlet casting. No shifting of the casting on the concrete structure to later match the curb alignment is permissible. The opening of the casting must match the opening of the concrete structure. Furthermore, the casting must be constructed so that steps that may be in the structure are easily accessible.

The Engineer shall set offset stakes for the alignment and grade of each structure prior to installation. The Contractor shall preserve the stakes so that the Engineer may check the alignment of the structure after it has been placed. The cost to replace the offset stakes for the purpose of verifying the alignment shall be withheld by the Owner from the final payment due the Contractor. After verification of the alignment the Engineer will submit a certification attesting to the same. The Contractor shall relocate the entire structure at his own expense if

found out of alignment. A minimum of 2 and a maximum of 6 adjusting rings to be used on all structures.

- D. **Sanitary Sewer Leakage Testing:** Leakage testing shall be required for all sanitary sewer main and service lines. For purposes of the test, the line between adjoining manholes will be considered a section and will be tested as such.
- E. **Air Test Method:** No additional compensation will be allowed for air testing equipment and materials required to perform the test. The testing gauge shall be located at ground level, out of the manhole, and have dial increments of 0.1 p.s.i. or less, and have a minimum 4" diameter face.
- F. **Hydrostatic Test Method:** The head of water for sewer main shall be 3' above the invert elevation of the upper manhole and for services shall be 3' above the highest invert elevation of service pipe being tested.
- G. **Infiltration Test:** If the ground water level is greater than 3 feet above the invert elevation of the upper manhole and the Engineer so approves, leakage tests shall be made to determine the amount of ground water infiltration into the sewers. Measurements will be taken by means of 90 degrees V-notch weirs placed in manhole. Measurements shall be taken at all points where, in the opinion of the Engineer the flow of the water in the sewer is greater than a maximal allowable leakage. No leakage for any section of sewer shall be allowed.

In case measurements indicate a leakage greater than the maximum allowable leakage, additional measurements shall be taken and continued until all leaks are located and the necessary repairs and corrective work have reduced the leakage in the section being tested below the maximum allowed by the Specifications. All rework and materials used for any connections must be approved by the Engineer. For purposes of the test, the line between adjoining manholes will be considered a section and will be tested as such. Leakage within manholes and from services shall be included in all testing.

The Contractor shall furnish the weirs and other materials and labor for placing the weirs in the sewer and shall assist the Engineer in making measurements. The Contractor shall receive no additional compensation for making the leakage tests or corrective work necessary to reduce the leakage below the maximum allowed.

- H. **Test Failure and Remedy:** Any failure areas after being repaired and/or replaced will require sewer televising of the area before acceptance by the City.
- I. **Inspection and Flushing**
Prior to final acceptance of each section of the sewer line, the Contractor shall flush a sewer-cleaning ball, the full diameter of the sewer, through all sewers up to 24" in diameter. Larger sewers shall be cleaned by other appropriate methods. All dirt and debris shall be prevented from entering the existing sewer system by means of watertight plugs or other suitable methods.



Upon completion of the Contract, the Engineer will carefully inspect all sewers and appurtenances. All sewers will be lamped by the Engineer. Any unsatisfactory work shall be removed and replaced in a proper manner. The invert of the sewer and manholes shall be left smooth, clean, and free from any obstructions throughout the entire line.

- J. **Deflection Test:** Thirty days after completion of the backfill to street subgrade, the Contractor shall test the sewer for deflection by pulling a GO, NO-GO deflection-testing Mandrell through the sewer. A deflection of more than five percent of the inside diameter shall be cause for rejection and the line will be removed and replaced at the Contractor's expense.
- K. **Televising:** The City requires all sanitary sewer services with risers to be televised and any areas where repair or replacement of the sewer main has been done prior to acceptance by the City. Sanitary sewer televising shall be done after the bituminous base course is placed. Also sewer televising can be required if the lamping inspection by City representatives indicates a problem and warrants the televising.

2100 STREET CONSTRUCTION

A. CONSTRUCTION REQUIREMENTS

In areas of fill, all organic material shall be removed prior to filling. Topsoil shall be separated and stockpiled as per MnDOT 2105 and shall be replaced on the slopes and boulevard sections to a minimum depth of 4 inches. Bituminous pavement excavated shall not be used as fill and shall be disposed of as approved by the City Engineer.

Compaction of all embankments shall be per MnDOT 2105.3F. The maximum density shall be the standard proctor density per ASTM D-698.

In cut areas, the Contractor shall scarify the subgrade to a minimum depth of 6 inches and re-compact it.

Material for embankments shall be deposited and spread in layers per MnDOT Section 2105.3E. Three feet of material compacted with a plate vibrator, plate tamper or button head pneumatic compactor shall be placed over the pipe before a hydro-hammer, vibratory or sheep foot roller is operated over the pipe.

Granular Borrow when required shall be per MnDOT Specification 3149 (Granular Backfill).

B. TEST ROLLING

At the discretion of the City Engineer, test rolling per MnDOT 2111 Specification may be required for streets with the subgrade surface bladed smooth to the satisfaction of the City Engineer prior to proof rolling. Test rolling, including all repairs to unstable sections and re-testing, will be considered incidental work to the project unless otherwise specified.

Test rolling of street subgrade shall be accomplished by use of a single axle truck, fully loaded, as determined by the City.



The City and its representatives will make the final determination of the roadbed is unstable. The roadbed shall be shaped to within 0.10 feet of the subgrade as shown on the drawings. Deflections are more than 0.05 feet, the roadbed is considered unstable.

C. SUBGRADE PREPARATION

After acceptance of the test rolling by the City, the subgrade shall be prepared per MnDOT 2112 and shall be inspected, checked for tolerance and approved by the Engineer prior to placement of aggregate base.

D. AGGREGATE BASE – VIRGIN MATERIAL NO RECYCLE MATERIAL

Virgin aggregate base shall be Class 5 in accordance with MnDOT Specification 2211. Aggregate sample shall be submitted to the Engineer for consideration at least seven day prior to delivery of the materials to the job site. If deemed necessary by City's representative's roll test, any unstable sections in the street area shall be corrected prior to the bituminous base course paving and to the satisfaction of the City Engineer.

E. CONSTRUCTION REQUIREMENTS

Compaction shall be obtained by the Specified Density Method per MnDOT 2211.3D.2.a.

2360 PLANT-MIXED BITUMINOUS PAVEMENT

- A. MATERIALS:** All bituminous mixtures shall conform to the Specification 2360 "Plant Mixed Bituminous Pavement" and Specification 3139 "Graded Aggregate for Bituminous Mixtures", and as modified in these specifications.

Prior to placing of any bituminous mix, the Contractor shall submit to the Engineer a letter from an approved testing laboratory that the aggregates and the proportions meet the requirements of the specifications. A certified trial mix from the Supplier shall determine the asphalt content, which is representative of the aggregate Materials actually used in the mix for this Project. This shall be reported to the ENGINEER at least five (5) days prior to the start of Work. The bituminous mixture shall meet the Mixture Design Requirements per 2360-1A.

B. RESTRICTIONS

Restrictions shall be the same as those specified in 2360.3B except as modified by the following:

C. MIXTURE PROPORTIONS

CONTRACTOR TRIAL MIX DESIGN: At least five (5) calendar days prior to the start of bituminous paving, the CONTRACTOR shall submit to the ENGINEER a job mix formula which has been approved by MnDOT's Bituminous Department.

It shall be the Contractor's responsibility, through the use of an approved testing laboratory, to determine the job mix formulas based on the aggregate to be used. The proposed job mix formula must be submitted to the Engineer at least five (5) calendar days and be approved



prior to placement of base, leveling or wearing course mixtures. All testing shall be at the sole expense of the Contractor.

The bituminous mixture types shall be as follows:

Bituminous Base Course	Type SP 12.5 Wearing Course – SPWEB340B
Bituminous Wearing Course	Type SP 12.5 Wearing Course – SPWEB340B
Bituminous Trails	Per City Engineer

Mixture evaluation will be based on the trial mix tests and the corresponding requirements listed in Table 2331-1A.

D. COMPACTING OPERATIONS

Compaction of all bituminous paving shall be according to the Maximum Density Method. Contractor testing is required per MnDOT 2360.

E. THICKNESS AND SURFACE REQUIREMENTS

The thickness of each course of bituminous placed shall be as shown on the plans.

F. CONSTRUCTION JOINTS

The longitudinal joint in the center of the road will made last and shall overlap any previously laid bituminous course longitudinal joint by at least 6 inches. Transverse joints in adjacent strips shall be separated by a minimum of 5 feet. Connections to an existing asphaltic mat shall be allowed only after the existing mat has had a vertical joint prepared for final connection. A uniform coat of bituminous tack material shall be sprayed on the existing surface to be matched into. Longitudinal joint construction of fresh pavement section shall be done while the mix is warm to ensure a neat junction, thorough compaction, and continuous bond throughout.

After final compaction of bituminous wearing course, all bituminous surfaces adjacent to manholes, valve boxes, and other miscellaneous structures shall be 3/8" plus or minus 1/8" higher than the surface of such structures. If the structures are not adjusted within the allowed tolerance, the contractor shall readjust them at no additional compensation.

G. BASIS OF PAYMENT

Add to the items included in the payment for bituminous mixture, job mix formula preparation, and bituminous material for mixture.

H. BITUMINOUS TACK COAT

The bituminous tack coat shall be applied to all construction joints and bituminous base surface prior to the construction of the bituminous wear surface and shall conform to the requirements of MnDOT, Specification 2357.

The tack coat material shall be an emulsified asphalt applied at the rate of 0.05 gallons per square yard.



2531 CONCRETE CURBING

A. MATERIALS

Prior to placing of any concrete, the ready-mix plant shall submit to the Engineer a letter from an approved testing laboratory that the aggregates and the proportions meet the requirements of these specifications. Such testing shall be at the sole expense of the Contractor and shall meet the approval of the City Engineer.

The City of Oak Grove will permit the use of membrane curing compounds meeting MnDOT Specification 3754. The material shall conform to the requirements of ASTM C309 and may be either Type 2 or Type 3. The material used on the job site shall have the contents clearly indicated on the container with specific reference to its conformance to the ASTM designation. The material shall be delivered in agitator type drums.

The Engineer shall take such samples as he deems necessary to determine the quality of the concrete. Compression tests of cylinders shall show not less than 3,900 p.s.i. at 28 days. The Contractor shall provide for suitable storage at the site to allow cylinders to cure in an environment similar to the site. The owner shall transport the cylinders and bear the costs of testing at an approved laboratory. Air testing of concrete per MnDOT 2461.A4b shall be done at intervals necessary to determine quality and acceptance as determined by the City Engineer.

B. CONSTRUCTION REQUIREMENTS

Design of curb and gutter will be as designated on the plans.

C. SLIPFORM MACHINE PLACEMENT

Curb machines may be used provided they are capable of meeting tolerance specifications for workmanship and finish.

D. CONCRETE CURING AND PROTECTION

The membrane curing method will be allowed with the minimum rate of application being one gallon per 150 square feet of surface area, which is about 40 feet of B618 curb and gutter.

E. JOINT SEALING

Joint sealing will not be required.

2573 TEMPORARY EROSION CONTROL

Erosion control fences shall be geotextile construction fabric meeting the requirements of MnDOT Specification 3886.2B.

A. TURF ESTABLISHMENT MATERIALS

1. **SEED FOR TURF ESTABLISHMENT:** Seed shall conform to MnDOT Specification 3876.



Seed Mixture No. 50B shall be used and applied at a rate of 75 lb./acre, and, in addition, 20 lbs/acre rate of annual rye grass shall also be applied. Because the Engineer may specify different seed mixture for areas such as Parks, steep slopes, ditches, etc. the contractor should check the plans for seed designations.

2. MULCH: Mulch shall conform to MnDOT Specification 3882, Type 1 mulch shall be applied to all seeded areas at the rate of two tons/acre and anchored by discing, except where plastic netting for stabilization is specified.
3. FERTILIZER: Fertilizer shall conform to MnDOT Specification 3881 type as determined by City Engineer applied at 250 pounds per acre.
4. SOD: Shall conform to MnDOT Specification 3878.

B. CONSTRUCTION REQUIREMENTS

Seed, mulch, fertilizer and sod shall be placed in accordance with MnDOT Specification 2575.3. Sod shall be rolled the same day of placement. Water cannot be taken from an unmetred hydrant.

Topsoil placement shall be performed in accordance with the applicable provisions of MnDOT Specification 2105. The seedbed shall be prepared to a depth of a minimum of three inches and a maximum of six inches. The top three inches must be firmed to provide a proper germination seed bed. The method of the firming operation shall be with a roller or cultipacker or other means as approved by the City. Topsoil shall meet the requirements of MnDOT Specification 3877 Topsoil Borrow. The Contractor shall be responsible in finding a source for topsoil.

**SECTION NINE:
CONSTRUCTION DRAWING - FORMAT AND STANDARDS**

The City requires specific plan format and graphic standards for infrastructure improvements which are to be owned and maintained by the City. The following provides, in outline form, the City's requirements for these plans:

9.1 GENERAL REQUIREMENTS:

- A. Organize plan sheets generally in the following order:
 1. Title Sheet
 2. Typical Sections and Details Sheet
 3. Grading Plan
 4. Erosion Control Plan
 5. Sanitary Sewer and Watermain Plan & Profile Sheets
 6. Storm Sewer and Street Plan & Profile Sheets
- B. Full size plan sheets shall be 22"x34". Half size plans, 11"x17" shall also be provided.

Scale: Horizontal Scale 1" = 50'
Vertical Scale 1" = 10' or approved scale by City Engineer



C. The following utilities shall be located in the approximate locations:

Sanitary Sewer	On centerline of street right-of-way. No curvilinear design is permitted.
Water Main	Ten feet on either side of centerline and/or parallel to sanitary sewer.
Storm Sewer	Ten feet or greater as necessary to avoid wheel paths to the opposite side of centerline as of water main.
All Street surface structures (i.e. manhole, gate valve covers, etc.) shall be located as necessary to avoid being in the traveled wheel paths.	

- D. All detailed drawings shall be on one separate sheet or included in the specification manual.
- E. The profile shall be directly below the plan with the stationing aligned as closely as practical. Stationing shall be shown on the plan view as well as the profile.
- F. All parcels shall be properly labeled with lot and block numbers and plat name, or parcel number in unplatted areas. Developed parcels shall have their address shown on the plan.
- G. All streets shall be clearly labeled.
- H. All match-line breaks shall be clean with reference points and plan sheet numbers of continuation clearly marked. All plans, which are broken by a match-line, shall be on the same or consecutive sheets.
- I. Existing utilities shall be shown and labeled as existing.
- J. Approximate locations of gas, electric, cable, telephone lines, pipelines, etc. shall be shown.
- K. Right-of-way and pavement or curb and gutter alignment data shall be shown. All easements shall be shown on drawings including sanitary sewer, watermain, and storm sewer.
- L. All plans shall have properly placed North arrows for each plan on the sheet.
- M. Benchmarks shall be placed on all sheets. (Top of existing hydrant is a preferable benchmark).
- N. The direction North will be oriented either up or to the right on all plan sheets for utility and street plans.
- O. Title Block shall be located along the right edge of bottom of each plan sheet and set in 1/2" from the edge. Information shall include name and address of engineering firm, sheet title name, sheet number, certification signature and registration number of Registered Professional Engineer, Project Title, horizontal and vertical scales, and City project number.
- P. Stationing on plans shall increase from south to north and west to east.
- Q. Use of all typical engineering symbols is required.

9.2 SPECIFIC REQUIREMENTS:

- A. **Location Map** (Scale 1" = 2000') showing the location and names of major streets all within one mile of proposed subdivision, all streets in the proposed project, all proposed or non-existing future streets and all other streets in the vicinity of the proposed project. The project area shall be indicated by circling.
- B. **Overall Plan** with a map scale of 1" = 50' - 200' showing the proposed project area and areas which drain through project area as well as adjacent property. Overall plan shall have the following information:
 1. Property lines - proposed in solid lines, existing in dashed lines.

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2. Street and street names.
 3. Schematics for proposed improvements of sanitary sewer, watermain, and storm sewer.
Proposed size and type of piping including manholes and appurtenances clearly shown.
Existing piping and appurtenances information shall be shown and labeled.
 4. All property within plan shall be identified with lot number, or appropriate title.
 5. Location and elevation of City or United States Geological Survey Bench Marks.
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- C. All manholes shall be numbered and stationed in both plan and profile.
 - D. Stationing of water curb box shall be indicated by "W" in front of stationing.
 - E. All water services shall be drawn to constructed length and length noted if other than to drainage and utility line. Indicate if jacked.
 - F. All water fittings should be labeled as to size and type such as bends, tees, plugs, etc.
 - G. The size and type of all sanitary sewer and water services shall be noted on the plans.
 - H. On combination sewer and water projects, services may be placed in the same trench with sanitary sewer services three feet downstream from water services.
 - I. All sewer and watermain shall be shown in profile with the appropriate information such as size, material, existing and proposed surface elevations, invert elevations, etc. Storm sewer plan should be on a separate sheet from sanitary sewer and water. Any utility crossings shall be shown on the profile. Indicate if possible conflict could exist.
 - J. All tie measurements to gate valves, service stubs shall be to the nearest foot.
 - K. When drafting utility and/or street plans, use a solid line for new utilities and a dashed line for existing utilities.
 - L. All utility and street plans will be drafted in CAD.
 - M. Any revisions must be noted initialed and signed on all affected sheets. The title sheet or the second sheet shall note the most recent revision date and the sheet affected by the revision.
 - N. The street construction plans shall show the centerline stationing and centerline curve data.
 - O. The street construction plans shall include a grading plan and/or cross sections.
 - P. If the gutter lines are different from the centerline, separate profiles need to be shown.
 - Q. All easements, permanent and temporary, shall be shown and labeled.

9.3 RECORD PLANS

- A. All record plans shall be plotted full size on mylar, and printed on 11"x17" paper. The developers Engineer shall provide the Record Plan in an electronic format compatible with AutoCad as well as a PDF Plotting file.
- B. Distances, lengths and ties on record plans shall be lettered in the SLANT FORM.
- C. All curb stop boxes and sanitary sewer lines shall be tied at the property line with at least two ties using the following priority:
 1. The served structure with address noted.
 2. Neighboring structures with address noted.
 3. Fire hydrants.
 4. Manholes, catch basins, if curb and gutter is in.
 5. Whenever possible, all ties should be less than 100'.
- D. All gate valves shall be tied with at least two ties using the following priority:
 1. Fire hydrants.



2. Manholes.
 3. Catch basins, if curb and gutter are in.
 4. Buildings or other permanent items.
 5. Whenever possible, all ties should be less than 100'.
- E. Final quantity tabulations shall be submitted for the following:
1. Sanitary sewer by footage and size.
 2. Watermain by footage and size.
 3. Number of HYD, G.V., M.H., C.B., Lift Station, etc.
 4. Storm sewer by footage and size.
 5. Number and size of services - sewer.
 6. Number and size of services - water.
 7. Streets by linear footage and square yards.
 8. Sidewalks by linear footage and square yards.
 9. Trails by linear footage and square yards.
- F. At the bottom of each record drawing sheet indicate the following:
1. Contractor's name.
 2. City Project number.
 3. Record plan and date completed.



PART III
INSPECTIONS, TESTING AND OTHER REQUIREMENTS

SECTION ONE:
PRE-CONSTRUCTION CONFERENCE

With any land development or public infrastructure construction activity within the City, the City's interests are on the quality of the work being performed, the facilities being constructed and the timelines of its progression. Minimizing the inconvenience and problems for the existing property owners and the general public is a primary goal of the City. Project administration in certain indirect project matters have a major impact upon project quality and construction scheduling. As such, it is necessary that controls be enacted upon the construction process to minimize these potential problems. Prior to any construction activity relating to grading and/or public infrastructure installation within the City, whether public or private, a pre-construction conference is required. The following pre-construction conference requirements are identified.

1.1 Pre-construction conference: Include pre-construction conference requirement in the contract specifications.

- A. The pre-construction conference is scheduled and coordinated through a City designated representative.
- B. Pre-construction conference is held at the Oak Grove City Hall.
- C. The following parties are required to attend the pre-construction conference: Prime contractor, all primary subcontractors, and a representative from all utility companies. Developer and/or designated representative, and affected regulatory agency representatives.

1.2 Submittals required prior to the pre-construction conference:

- A. Bar chart schedule.
- B. Subcontractor and supplier list.
- C. Manhole and catch basin shop drawings.
- D. Concrete mix design.
- E. Bituminous mix design.
- F. Aggregate base source and testing results.
- G. MnDOT certified testing personnel to be used.

1.3 Format: The following pre-construction format will generally be adhered to:

- A. General introduction and sign-up sheet.
- B. Verify contract status/requirements.
- C. Identify project management team.
- D. Contractor's authorized representative (*including Superintendent, Foreman and Emergency Phone Numbers*).



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- E. Engineer's description of project (*including Contract Start Date, Working Days, Contract Completion Date as specified in the development agreement, and Special scheduling, if any*).
 - F. Extra sets of plans and specifications.
 - G. Contractor's proposed schedule/written schedule and bar sheet required (*including Start Date, Days and Hours of Work - identifying City Code restrictions, Work Force and Equipment, and Subcontractors*).
 - H. Utility companies and locations (*including gas, telephone, electric, cable and City*).
 - I. Traffic (*including Barriers and Enclosures, Access Roads, Provide and Maintain Proper Warning Control Devices, Notification to City's designated representative in addition to Police, Fire, School District, Ambulance Service, designated public transit service and street department of road closure 48 hours in advance, and Permit Requirements of jurisdictional agency for open cutting public streets*).
 - J. Temporary removal and reinstallation of existing street signs and mailboxes. [**Do not remove street signs that are the property of the City. Notify City Street Department 48 hours in advance of need to remove appropriate City street signs.**]
 - K. Use of City water system. (*including Compliance with regulations of the MN Dept. of Health*) [**Hydrant use for obtaining water for turf establishment, gravel or asphalt paving or other construction operations is prohibited. Water loading stations are provided for this purpose. Contact the Public Works Department for locations and related information.**]
 - L. Permit To Proceed. [**Prior to any construction activities, a Permit to Proceed must be issued by the City**]

SECTION TWO: SUBDIVISION MONUMENTATION

Minnesota State Statute requires subdivision monumentation of all plats within one year of recording with the County. The City requires all subdivision monumentation necessary to provide control for the installation of public infrastructure improvements be established prior to issuance of the "Notice to Proceed".

SECTION THREE: CONSTRUCTION STAKING REQUIREMENTS

3.1 SANITARY SEWER:

- A. Line and grade stakes shall be set every 25' for the first 100' out of the downstream manhole, and every 50' thereafter to the next manhole.
- B. A line reference stake shall be set for each manhole.
- C. Wye locations, stationing from the downstream manhole, shall be staked and the stationing shown on the cut sheets.
- D. Proposed elevations of service inverts at the 45 degree bend for the end riser shall be staked and shown on the cut sheets.
- E. Proposed structure top elevation and upstream and downstream invert elevations shall be shown on the cut sheets (manhole castings shall be set 3/8" to 5/8" below finished street



grade).

3.2 WATERMAIN:

- A. Line and grade stakes shall be set every 50' (top of watermain shall be staked 8-feet below finished elevation).
- B. Fitting locations shall be staked and the stationing shown on the cut sheets.
- C. Line and grade stakes shall be set for all hydrants.
- D. Proposed elevations of the tops of curb boxes shall be staked and shown on the cut sheets. Line reference stakes shall be set for curb box locations.

3.3 STORM SEWER

- A. Line and grade stakes shall be set every 25' for the first 100' out of the downstream manhole, and every 50' thereafter to the next manhole or catch basin.
- B. An offset hub and line reference stake to back of curb shall be set for all catch basins and catch basin manholes.
- C. Catch basin top and invert elevations and manhole top elevation and upstream and downstream invert elevations shall be shown on the cut sheets.

3.4 STREETS

- A. When centerline stakes are set for grading subgrade, cut sheets shall be provided, Blue Top every 100' for either final subgrade or final aggregate base tolerancing.
- B. Line and grade stakes shall be set every 25' and for all begin, mid and end radius points of the curb at street intersections.
- C. Cut sheets shall be provided for all curb and gutter construction.

NOTE: ALL CUT SHEETS MUST IDENTIFY BENCH MARKS USED, BENCH MARK ELEVATIONS, ACTUAL HUB ELEVATIONS, PROPOSED ELEVATIONS, AND CUTS OR FILLS FOR ALL ENTRIES.

It is also imperative that the contractor and project inspector for the City have cut sheets in hand prior to construction. The City will order contract to cease working whenever this requirement is not met.

**SECTION FOUR:
CONSTRUCTION INSPECTION AND TESTING REQUIREMENTS**

It is the policy of the City of Oak Grove that any construction activity within the City be monitored/inspected by the City staff personnel or a designated representative on behalf of the City. All City construction designated project representatives are required to complete daily a "Construction Project Status Report" which is submitted weekly to the City.

All public infrastructure facilities will be tested in accordance with the appropriate sections of this manual and witnessed by the City designated project representative.

4.1 STORMWATER RUNOFF CONTROL SITE INSPECTION PROCEDURES

A. Priority Sites:

1. Priority sites are chosen based on compliance history.
 - a. These sites will be inspected a minimum twice weekly during active construction.
 - b. These sites will also be inspected within 24 hours after a rainfall event greater than 0.5 inches in 24 hours.
2. Non-priority Sites:
 - a. Non-priority site will be inspected at least once every seven days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours.

B. Documentation

1. Erosion Control Inspection/Maintenance Record to be completed on MPCA form.
2. Inspection logs will be retained for 3 years after the development warranty period has expired.

SECTION FIVE:

SCHEDULE OF REQUIRED UTILITY TESTS

5.1 WATERMAIN PRESSURE TEST

- A. Follows installation of all main line pipe, services and hydrants, and pre-testing by Contractor.
- B. Requires 48 hours notice be given to City Project Representative by Contractor prior to record test.
- C. Witnessed by City Project Representative.

5.2 ELECTRICAL CONDUCTIVITY TEST

- A. Performed on all iron pipe water mains within 7 days of satisfactory completion of the pressure test.
- B. Requires 48 hours notice to be given to Project Representative by Contractor prior to test.
- C. Witnessed by Project Representative and representative of City Public Works Department.

5.3 WATERMAIN BACTERIOLOGIC QUALITY TEST

- A. Performed on the completed watermain after final flushing and before being placed in service.
- B. Samples taken by an approved testing laboratory.

5.4 SANITARY SEWER AIR TEST

- A. Follows completion of all main line pipe, service pipe and manhole installations.
- B. Requires 48 hours notice to be given to Project Representative by Contractor prior to test.
- C. Witnessed by Project Representative.



5.5 SANITARY SEWER MANDREL TEST

- A. Follows completion of all main line pipe installations by a minimum of 30 days.
- B. Requires 48 hours notice be given to Project Representative by Contractor to test.
- C. Witnessed by Project Representative.

**SECTION SIX:
SCHEDULE OF REQUIRED STREET CONSTRUCTION TESTS**

6.1 RANDOM SAMPLING OF AGGREGATE BASE: The sampling of aggregate base material for gradation compliance shall be taken at the project site, as the material is being placed and prior to being compacted. The rate of sampling shall be necessary to determine the quality of material being delivered as determined by the City’s inspection representatives.

All required testing of the aggregate base samples shall be as stated in the special provisions referred to as “tests”. Gradation test procedures performed shall conform to MnDOT Specifications No. 3138. A delay of three working days is anticipated before test results are available.

The gradation results obtained from three samples representing 1,500 tons of aggregate material will be averaged to the nearest one tenth of one percent for each sieve size. These results shall be compared to those stated in MnDOT Specification 3138.

6.2 CONCRETE CURB: In accordance with MnDOT Specification 2531.

6.3 BITUMINOUS COURSE MIXTURES:

- A. **Random Sampling:** The aggregate material for bituminous base course mixture shall conform to MnDOT’s BA-2 requirements. The specific aggregate gradation limits for the base course mixture shall conform to the specific job-mix formula. The base course mixture with its aggregate gradation limits established in the job-mix formula shall have tolerances as stated in MnDOT Specification 2360.

There will be random sampling to the bituminous base course mixture to determine the aggregate gradation and its compliance to the specifications stated above. The rate of sampling shall be one sample per 400 tons with a minimum of three samples for the in-place base course. Fifty pound samples shall be taken at the auger located at the rear of the paving equipment.

All required testing of the bituminous base course samples shall be stated in the special provisions referred to as “tests”.

Testing of the samples for gradation and oil content will be accomplished by an independent testing laboratory and conform to ASTM C117, C136, and D2172. If the test results indicate that the gradation of the aggregate in the bituminous mixture is outside of the job mix formula (JMF) working range, payment for bituminous mixture shall be made to the City with the following formula.

The difference between the failing percentage and the JMF working range percentage shall be multiplied by a factor of 2. The failing percentages for each sieve shall be summed and the result will equal the total percentage to be used for payment to the City. This payment shall be applied against all mix placed from which the test samples were obtained.

- B. **Compaction:** Compaction for the bituminous wear course shall be obtained by the specified density method. The required density for the bituminous wear course is not less than 95% of the density obtained when a sample of the mixture from that course is compacted by the Marshall Compaction Method.

The wear course shall be compacted to the required density with the use of a steel drum roller and finished with a self-propelled pneumatic tired roller.

Under the specified density method, samples of the bituminous wear course mixture shall be compacted by the Marshall Compaction Method. The weight in pounds per cubic foot shall be determined in accordance with procedures stated in the MnDOT Bituminous Manual.

The rate of sampling shall be not less than one sample per 400 tons placed for the wear course. Sampling shall be done by either core drilling the in-place wear course material to sufficiently determine the test results, or with the use of a portable nuclear density testing. With the use of the nuclear density testing, a mean density shall be determined by averaging the results of 5 nuclear tests. These tests shall be taken at the same location where a sample of bituminous wear course material has been taken for the Marshall compaction testing.

All required testing for compaction shall be stated in the special provisions, referred to as "tests". The nuclear density method shall conform to ASTM: D2922-7B.

If the specified density of the in-place wear course mixture is not obtained, the mixture with failing density will not be accepted.

SECTION SEVEN: SCHEDULE OF REQUIRED FINAL INSPECTIONS

7.1 SANITARY SEWER

A. Lamping and Initial Inspection of Sanitary Sewer

1. Performed the same day as the mandrel test or as soon as possible thereafter by designated City Project Engineer.
2. Punch list of any required corrective work is given to designated City Project Engineer.
3. After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Engineer.



B. Final Inspection of Hydrants, Hydrant Valves, and Curb Boxes

1. Performed after completion of final manhole casting adjustments and construction of first lift of bituminous, and prior to any building Certificate of Occupancy permit by designated City Project Manager.
2. Punch list of any required corrective work is given to designated City Project Engineer.
3. After the contractor certifies completion of all punch list items, corrective work is re-inspected by designated City Project Manager.

7.2 WATERMAIN

C. Final Inspection of Main Line Valves

1. Performed after construction of first lift of bituminous by designated City Project Manager.
2. Punch list of any required corrective work is given to designated City Project Manager.
3. After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Manager.

D. Final Inspection of Hydrants, Hydrant Valves and Curb Boxes

1. Performed after completion of all street construction, including final boulevard grading and restoration, by designated City Project Manager.
2. Punch list of any required corrective work is given to designated City Project Manager.
3. After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Manager.

7.3 LAMPING AND FINAL INSPECTION OF STORM SEWER

- A. Performed after completion of all street construction, including final grading and restoration of boulevards, ponding areas and drainage swales, by designated City Project Manager.
- B. Punch list of any required corrective work is given to designated City Project Manager.
- C. After completion of all punch list items is certified by contractor, corrective work is re-inspected by a designated City Project Manager.

7.4 FINAL INSPECTION OF STREETS

- A. Performed after completion of all street construction, including final grading and restoration of boulevards, ponding areas and drainage swales by a designated City Project Manager.
- B. Punch list of any required corrective work is given to designated City Project Manager.
- C. After completion of all punch list items is certified by contractor, corrective work is re-inspected by a City designated Project Manager.