



**CITY OF PLYMOUTH
ENGINEERING GUIDELINES
&
STANDARD DETAIL SPECIFICATIONS FOR
SANITARY SEWER, WATERMAIN, STORM
SEWER & STREET CONSTRUCTION**

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FOREWARD

In order to standardize engineering requirements for Developers and Engineers performing work within the City of Plymouth, it is important that certain guidelines be adopted.

This manual as well as the City's "Standard Detail Specifications", outlines certain requirements and standards that should be incorporated into the preparation of plans and specifications for sanitary sewer, storm sewer, watermain, trails, and street construction within the City of Plymouth. Compliance with these documents will help provide quality projects and assure uniform performance standards for the citizens of Plymouth.



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City Engineer

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ENGINEERING GUIDELINES

The City of Plymouth Engineering Guidelines and Standard Detail Specifications are intended to supplement the Subdivision Regulations in Chapter 5 of the City Code. If any conflicts between the Engineering Guidelines or Standard Detail Specifications and the City Code are identified, the City Code shall supersede them. Where the term “City Engineer” appears, it shall refer to the City Engineer or an assigned designee.

I. GENERAL ENGINEERING REQUIREMENTS

As set forth in various sections of the City ordinances, Developers of property within the City of Plymouth are required to submit certain plans and specifications for review and approval by the City. These include, but are not limited to items such as grading plans, drainage plans, topographic surveys, plats, street and utility plans and specifications. Competent professionals shall prepare these plans and specifications.

The professional services required of the Developer might include an architect, land surveyor, planner, wetland specialist and engineer. “Project Engineer” in this document refers to a Professional Engineer registered in the State of Minnesota hired by the Developer. The Project Engineer responsibilities include not only preparation of plans and specifications, but also field staking and full time resident inspection in order to assure the City that the completed project is in conformance with the approved plans and specifications.

Whenever public improvements or other conditions of approval are required with an approved development, a contract (Development Contract) is required between the Developer/property owner and the City. This contract guarantees the City that all requirements will be satisfactorily completed by the Developer. Within the development contract, the Developer has a choice in determining how the required improvements will be handled. The Developer can either construct and finance the improvements or request that they be installed under a public improvement project, if approved by the City Council.

1. Developer Installed Public Improvements

If the Developer chooses to install required public improvements within the development, the following procedures shall be followed:

- a. The Developer shall submit plans, specifications and copies of all design calculations to the City for review and approval. The developer shall submit an electronic copy in AutoCAD’s DWG file format and PDF format, of the reviewed plans/construction documents. These plans are to be prepared by a Registered Professional Engineer and shall be in accordance with City standards as outlined herein. The City’s comprehensive plans for sanitary sewer, water, storm drainage and thoroughfare plans shall be adhered to in design considerations. All sanitary sewer and watermain testing shall be

completed and copies of service ties submitted to the City prior to issuance of any service connection permits.

- b. The Developer shall submit a Grading, Drainage and Erosion/Sediment Control Plan to the City for review and approval. No work is to begin until all erosion and sediment control methods are in place and approved by the City's Engineering Division. All project operations must comply with the City's Erosion Control Ordinance (see Appendix A).
- c. The Developer shall provide proper notification of improvements to the responsible governmental agencies, watershed districts, etc. affected by said construction. All necessary permits shall be obtained by the Developer and copies provided to the City's Engineering Division prior to commencing any work. All special requirements of the responsible agencies shall be complied with. The City is the responsible Local Government Unit (LGU) for implementation of the Wetland Conservation Act.
- d. The Project Engineer will be responsible for not only plan and specification preparation, but also for providing staking and resident inspection of said improvements to assure compliance with the approved plans. No individual shall serve as the inspector other than those having prior approval of the City. Written qualifications of each proposed inspector shall be presented to the City prior to scheduling the preconstruction conference.

The inspector shall be distinct from the survey crew and have one of the following minimum qualifications:

- 1) Graduate of a two-year program in civil technology from an accredited school with two years of municipal/civil construction inspection experience; or
- 2) Technician with a minimum of six years of municipal/civil construction inspection experience; or
- 3) Civil engineer-in-training with a minimum of one year of municipal/civil construction inspection experience; or
- 4) Registered Professional Civil Engineer

In addition, the Project Engineer shall provide weekly construction activity reports to the City Engineer. These reports will be due each Monday by 4:30 P.M. for the previous week commencing with the site grading. Included in the report shall be a construction schedule indicating percentage completed, a summary of all test results and an explanation of any problems and/or test failures and how they are being resolved. Failure to provide those reports may result in project shutdown.

- e. The Developer shall furnish to the City a list of contractors and sub-contractors being considered for retention by the Developer for any of the public improvement work required in the project prior to the preconstruction meeting. The City has the right to reject any contractor or subcontractor deemed unacceptable for City work.
- f. The contractor shall submit a list of suppliers as well as all certification tests of materials that will be used on the project to the City Engineer at the “Pre-construction” meeting.
- g. The Contractor shall furnish and install a project sign for City projects as shown in Standard Plate numbers [DWG-1](#).
- h. Any changes to the approved plans and specifications shall be approved by the City Engineer in writing before changes are made in the field.
- i. The City Engineering Division will provide periodic inspections of public improvement work and shall be notified 24 hours in advance of all scheduled tests so its representatives can be present at the time tests are performed. The required tests will cover the sanitary sewer, watermain, storm sewer, street subgrade, base course, wear course, and curb and gutter. These inspections do not in any way lessen the responsibility of the Developer to provide full time construction inspection.
- j. Upon completion of all the utility and road work required on both the public and private portions of the project, the City Engineer will make the required final inspections of all work. This includes a final inspection of all site grading and approval by the City Engineer before any building permits will be issued. Before the final payment is made to the contractor by the Developer, the City Engineer shall be satisfied that all work is satisfactorily completed in accordance with the approved plans and specifications, and the Project Engineer submit a written statement attesting to same. Acceptance of said work shall be made by resolution of the City Council upon the recommendation of the City Engineer and with the posting of the letter of credit for the warranty of the utilities and streets.
- k. After all public improvements have been completed and properly inspected as specified above, and an acceptable maintenance guarantee provided, the public improvements will be scheduled for acceptance by the City Council subject to the following:
 - 1) The Project Engineer must submit written certification to the City Engineer stating that all public improvements have been completed in accordance with the approved plans and specifications.
 - 2) The Project Engineer shall provide the City with a complete set of record plans as spelled out in the “[Record Plans Standards](#)”, as outlined in this manual.

- I. Guarantee Period - If within the time prescribed by the Development Contract, any of the work is found to be unacceptable, the contractor shall correct it promptly. The City shall give prompt notice after discovery of any unacceptable condition to the engineering firm or the developer responsible for the project.

Unless otherwise noted in the development contract, the following requirements shall apply:

- 1) The contractor shall guarantee all work relating to utilities and their appurtenances, material and equipment furnished by them for a period of two years from the date of City Council acceptance of the work or project.
- 2) Final wear course placement on either the public or private roads will be allowed in a new housing development only after one freeze – thaw cycle and after 75% of all units have been issued a “certification of occupancy” (C.O.). Placement of wear course on new streets on non-housing projects shall be after one freeze – thaw cycle. An inspection of the roadway will be performed by the City Engineer prior to wear course placement. From this inspection, any deficiencies or damage to the street, sidewalk and curb will be noted and will need to be corrected prior to the placement of the wear course.
 - a) The developer after the first freeze thaw cycle and upon approval of the City Engineer, may pave the final wear course prematurely provided the street line items in the developments “Letter Of Credit” remains at 80% of their original amount until they are accepted. The streets acceptance process will remain unchanged and begin once 75% of the development units have a C.O. An inspection of the roadways, sidewalks and trails will be performed at that time and any repairs found, be corrected. If more than 50% of the curb is replaced, per specification section [\(2404.15J\)](#). The developer will be required to mill off all the wear course, replace all of the curb and gutter, and repave the wear course.
- 3) The contractor shall guarantee all work relating to street, sidewalk, and trail construction including concrete curb and gutter, materials and equipment furnished by him for a period of one year from the date of City Council acceptance of the work or project,
- 4) The Developer or the Developer’s contractor shall provide a letter of credit for the required one or two year duration to the City prior to City acceptance of street or utilities portions of the project.

2. Private Improvements

If private drives or utilities are included in a development the following procedures are required:

- a. The design cross section of private drives shall be in accordance with the public street design requirements
- b. Whenever practical, public sewer and water lines shall not be placed under private drives. A minimum of twenty (20) foot utility and drainage easement will be required for any public utilities that are not constructed within the public street right-of-way. Depending on utility depth, a wider easement will be required by the City Engineer when deemed necessary for utility replacement. A minimum of 1.5:1 trench slope will be used in determining easement width.
- c. Private utility installation requires a sewer/water permit from the City and will be required to meet all applicable City Standards as determined by the City Engineer and/or Building Official.
- d. As set forth in the Private Drives section of the City Zoning Ordinance, the entrance to each private drive must include design features that clearly differentiate it from a public street such as concrete apron or different paving material.
- e. Private small utilities shall be installed per standard details **STRT-19 & 20** in the Standard Detail Specification for Street Construction. Junction boxes shall not be installed on property lines that have public utilities installed under them.

II. CITY STANDARD PLANS

In order for the City to have standardized construction and record plans, the guidelines listed below shall be followed. (ORD. 2010-02, 2/23/2010)

1. General Requirements- City Standard Plans

- a. A sheet indicating the components of the entire project with corresponding sheet numbers on each separate sheet and index shall be incorporated into the set of plans.
- b. A complete set of approved project construction plans shall be submitted to the City's Engineering Division in AutoCAD's DWG and Adobe's PDF format prior to the preconstruction meeting.

- c. The Project Engineer shall provide the City with a complete set of record plans as spelled out in the "[Record Plans Standards](#)", as outlined in this manual.
- d. For new residential developments, create separate sheets covering at a minimum the construction of:
 - 1) Sewer and Water
 - 2) Storm sewer and Streets
 - 3) Grading, drainage and erosion control
 - 4) Signage and striping if required
- e. All sheets shall be 22" x 34" (Ansi D)
- f. Horizontal Scale 1" = 50'
Vertical Scale 1" = 10'
- g. All utilities shall be located at the following approximate locations:
 - 1) Sanitary Sewer - on centerline of street right of way
 - 2) Watermain - ten feet north or east of centerline
 - 3) Storm Sewer - ten feet south or west of centerline

When designing a roadway that is U shaped, the utilities shall remain on the same side of the street as they started. Crossing over to the other side of the street with the utilities to meet the above requirements is not required.
- h. All detail drawings shall be on a separate sheet and referenced to the proper sheet. Use unmodified "City's Standard Details Plates".
- i. 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. Center line stationing at each intersection shall be noted in the profile and or plan view.
- j. All parcels shall be properly labeled with lot and block numbers and plat name, or P.I.D. in unplatted areas. Developed parcels shall have their address shown on the plan.
- k. All streets shall be clearly labeled.
- l. All match line breaks shall be clean with reference points clearly marked. All plans, which are broken by a match line, shall be on the same or consecutive sheets.

- m. Existing utilities shall be shown in both plan and profile, stationed and labeled as existing.
- n. Locations of gas, electric, telephone and other utility lines shall be shown.
- o. Right-of-way and pavement or curb and gutter alignment data shall be shown.
- p. All plans shall have properly placed north arrows for each plan view on the sheet. North arrows shall be orientated either up or to the left.
- q. All manholes shall be numbered in both plan and profile with numbering starting at the lowest elevation manhole.

2. Sanitary Sewer- City Standard Plans

- a. Stationing of sanitary sewer wyes shall be indicated "S" in front of the stationing.
- b. All sanitary sewer services shall be drawn on the plan to the proposed length and the length noted. Indicate if jacked.
- c. If the sanitary sewer wye only is to be constructed, it shall be noted as "Wye Only" after stationing.
- d. All sanitary sewer main shall be shown in the profile with the appropriate information such as size, material, grades, invert elevations, etc.
- e. The size, type, and invert elevation of all sanitary sewer services shall be shown on the plans. If risers are installed, the height of each riser shall be indicated on the plans and also drawn on the profile.
- f. On combination sewer and water projects, services may be placed in the same trench with sanitary sewer services three feet downstream from water services. Locations will be noted on the plans with an "S & W" in front of the stationing.
- g. All water services shall be located 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) Other permanent structures (bridges, telephone boxes, electrical boxes, etc.)
 - 6) Power poles, trees, other semi-permanent items

- h. See Standard Detail Plate [DWG-3](#) for all required notes to be shown on all record plan sheets.

3. Watermain- City Standard Plans

- a. All hydrants, gate valves and tees shall be stationed at the bottom of the profile.
- b. All curb stop boxes shall be indicated by a "W" in front of its stationing.
- c. All water services shall be drawn to the proposed length and the length noted if other than 10 feet beyond the property line. Indicate if service is jacked.
- d. All watermain shall be shown in the profile with the appropriate information such as size, material, depth below proposed grade, etc.
- e. The size and type of all water services shall be noted on the plans.
- f. All main line gate valves and curb stops shall be located with at least two ties, using the following priority:
 - 1) Fire hydrants
 - 2) Manholes
 - 3) Catch basins
 - 4) Buildings or other permanent structures
 - 5) Power poles, trees, other semi-permanent items
- g. See Standard Detail Plate [DWG-3](#) for all required notes to be shown on all record plan sheets.
- h. Hydrants shall not be installed on the same side of the street as the sidewalk or trail.

4. Storm Sewer- City Standard Plans

- a. Record plans of all ponding areas are required. Plans shall indicate spot elevations at 1 per 100 sq. ft. from the bottom of the pond to a minimum of 2 feet above the high water level. Overlay spot elevations of previously approved master grading plan. Normal water elevation, high water elevation, and the acre-feet of storage for each ponding area along with the storm sewer outlet, shall be shown on the plans. The required 10:1 bench shall be clearly identified on the record plan.
- b. All storm sewer shall be shown in the profile with the appropriate information such as size, material, grades, invert elevations, etc.

- c. See Standard Detail Plate [DWG-2](#) for all required notes to be shown on all record plan sheets.

5. Streets- City Standard Plans

- a. Show where geotextile fabric has been placed and subgrade corrections made on the plan portion of the record plans. Also indicate if any surcharging has been used.
- b. Show a typical street section and contractor's name on all sheets of the record plans.
- c. See Standard Detail Plate [DWG-2](#) for all required notes to be shown on all record plan sheets.
- d. Show that all pedestrian ramps are in compliance with current ADA guidelines.
- e. Stationing of the centerline at the beginning and ending of the project, as well as all intersections shall be placed in the drawing's profile. Stationing at the beginning of all streets shall start with 0+00.

III. **DESIGN STANDARDS**

The Project Engineer is solely responsible for providing a quality design that meets all applicable laws and design standards. The City has adopted the following design standards for public facilities within the City of Plymouth. These standards are meant to enhance not replace sound engineering judgment and industry standards.

1. Sanitary Sewer- Design Standards

- a. The following wastewater flows shall be used:

| WASTEWATER UNIT FLOW RATES | | | | | |
|----------------------------|------------------|--------------------------|---------------------------|----------------|---------------------------|
| Land Use Type | Persons/ Unit | Gal/Cap/ Day (GCD) | Gal/Unit/ Day (GUD) | Units/ Acre | Gal/Acre/ Day (GAD) |
| LA - 1 | 3.0 | 90 | 270 | 3 | 810 |
| LA - 2 | 2.5 | 85 | 213 | 6 | 1,275 |
| LA - 3 | 2.2 | 80 | 176 | 9 | 1,584 |
| LA - 4 | 2.0 | 75 | 150 | 12 | 1,800 |
| Commercial/Industrial | | | | | 1,000 |
| Public Use | | | | | 1,000 |
| Parks and Open Space | | | | | 250 |

- b. Maximum spacing between manholes shall be 400 feet.
- c. Minimum main line pipe grade for 8" diameter pipe shall be 0.40%.

- d. All off road sanitary sewer manholes must be accessible to the city's maintenance vehicles. Construct a 12' wide drive with 12" of gravel (Class 5) paved with 3" of (2360 SPWEA240C) bituminous wear course with turn around. See Standard Specifications for Sanitary Sewer Detail **SS-9**. Alternate road materials may be proposed for consideration during plan review.
- e. See the "Standard Detail Specifications for Sanitary Sewer Construction" for Standard Detail Plates.

2. Watermain- Design Standards

- a. Watermain and water services shall be placed with minimum 7.5 feet of ground cover from the top of pipe to finished grade. A minimum vertical separation of eighteen inches (18") must be provided between the outer surfaces of the pipes, with preference that the watermain cross above the sewer, wherever possible.

One full length of water pipe shall be located so both joints will be as far from the sewer as possible.

- b. Watermain that is installed on a vertical slope with a 10% grade or steeper shall have all the joints along that slope tied.
- c. Individual water services shall be a minimum of 1" outside diameter pipe or larger as determined by system design results when fire sprinklers are required. A minimum of 1 ½" outside diameter pipe is required when fire sprinklers are needed.
- d. Gate valves shall be required for all hydrants. (See watermain detail **W-2**).
- e. Hydrants shall be placed on the opposite side of a roadway from any sidewalk or trail that will be installed.
- f. In high-pressure areas, (below elevation 945) the City will require pressure reducing valves within the structure at the service entrance.
- g. In low-pressure areas, (above elevation 1015) the City will require pressure booster pumps.
- h. See the "Standard Detail Specifications for Watermain Construction" for Standard Detail Plates.

3. Storm Sewer- Design Standards

- a. The following values shall be used for hydraulic and hydrologic design unless variation is clearly supported by engineering data.

1) Rational Formula "C" coefficient

- a) Parks and Public 0.2
- b) LA1, LA2 0.4
- c) LA3, LA4 0.5 – 0.8
- d) Commercial/Industrial 0.6 – 0.9

2) Manning's "n" coefficient

- a) PVC 0.011
- b) HDPE 0.011
- c) RCP 0.013
- d) Grass Channel 0.030 – 0.040

3) Time of Concentration "Tc"

- a. Trunk Main 20 min.
- b. Laterals 10 – 20 min. (15 min. typical)
- c. Parking Lots 5 – 10 min.

- b. Design of the storm drainage system shall be based on a 10-year frequency storm for local storm sewer, 10-year frequency storm for trunk storm sewer, and a 100-year frequency storm for ponds and open channels. The design storms shall be as defined in NOAA's Atlas 14, volume 8. Common values for 10 year frequency storms events are:

| "Tc" | Intensity 10yr |
|---------|----------------|
| 10 min. | 5.5 in. / hr |
| 15 min. | 4.5 in. / hr |
| 20 min. | 3.9 in. / hr |

- c. Emergency overflow drainage routes shall be provided at all locations at least 1.5 feet below the lowest building opening. An overflow drainage route shall be constructed in a manner that will accommodate a 100-year storm.
- d. Any swale flatter than 2.0% must have drain tile installed to ensure adequate drainage. Any backyard swale longer than 400 feet or four residential lots will be required to have a storm sewer inlet. Other swales may require drain tile if determined by the City Engineer.
- e. Storm sewer catch basins, catch basin manholes and manholes shall be designed with a minimum four (4') build from the lowest invert to the top of casting or flow line of a catch basin grate.
- f. Storm sewer shall be designed using minimum of 15" inner diameter, with the exception of draintile.
- g. Approved surface water treatment options include NURP ponds, iron enhanced sand filter/trench/bench, green roofs, porous pavements, or

approved equal. Native plantings are not approved treatment options. Refer to Minnesota Storm water manual for design considerations.

h. Pond Design Parameters

- 1) Ponds intended to provide water quality shall be designed to NURP standards.
- 2) To promote settling and provide space for sediment accumulation, the average depth of the permanent pool shall be at least 4 feet with a maximum depth of 10 feet.
- 3) Basin side slopes shall be a maximum of 3:1 above and below the normal water level. A 10-foot wide bench with a maximum slope of 10:1 shall be constructed extending into the pond from the normal water level. A minimum 5' wide pond berm shall constructed.
- 4) The pond should be wedge shaped with the inlet at the narrowest end and the outlet at the widest end. A length to width ratio of 3:1 or greater shall be used whenever possible. Distance between storm sewer outfalls and the pond outlet should be maximized. (See Standard Storm Sewer Plate No. **ST-12**)
- 5) An emergency overflow structure and stabilized (rip-rap or cable concrete) spillway shall be provided to accommodate discharges from storms greater than the design storm.
- 6) The high water levels of the storm water ponding areas shall be based on a 100-year storm. The minimum freeboard above the established high water levels for the lowest floor shall be two (2) feet.
- 7) Adequate access for future maintenance including easements, grading and elimination of obstructions shall be provided. This may require the construction of access roads for heavy construction equipment. Access roads shall be constructed with an unobstructed 15 foot wide minimum access including a 12' wide driving surface with a maximum 7 % vertical grade and 3 % horizontal grade.

i. Wetland Design Parameters

- 1) Designed outlet and emergency spillway are required.
- 2) Follow the Board of Soil and Water Resources (BWSR) recommended wetland management standards and hydrologic guidelines for bounce, inundation, and runout control.
- 3) All existing wetland sediment will be completely removed from the wetland buffer and mitigated area. No wetland sediment/soil shall be used as backfill in the wetland mitigation areas.
- 4) Prior to planting and seeding all newly constructed wetland and buffer areas shall be treated to control weed growth with herbicide that breaks down sufficiently within 14 days to allow planting.
- 5) For new wetland buffer areas adjacent to existing wetlands, two rows of perimeter control shall be installed along the edge of the wetland prior to any grading. After the buffer area has been graded, prepared, seeded, planted, and buffer monuments installed, a line of perimeter

control shall be installed along the edge of the buffer area. All perimeter control shall be maintained in accordance with the City Erosion Control Ordinance.

- 6) Lowest floor elevation shall be two (2) feet above the 100yr flood elevation, or three (3) feet above the Ordinary High Water (OHW) of the public waters.

j. Water Quality Design Standards

- 1) Surface water runoff rate and volumes from proposed conditions shall be equal or less than existing conditions, for the 2, 10 and 100-year storm events.
- 2) All projects that create one or more acres of new or fully reconstructed impervious surface must design a stormwater management system that meets the Minnesota Pollution Control Agency's Minimal Impact Design Standards (MIDS). If the project uses a flexible treatment option, provide a description of how the project qualifies and is meeting the flexible treatment option.

- k. See the "Standard Detail Specifications for Storm Sewer Construction" for Standard Detail Plates.

- l. Drainage calculations shall be submitted using HydroCAD and MIDS calculator or approved equal.

4. Streets- Design Standards

- a. Soil testing is required to provide for a 20-year pavement design section. The Project Engineer shall provide recommendations for pavement design sections based on the existing subgrade soils. The design criteria, as outlined on the City's Standard Street Plate No. **STRT-14** shall be used. Where soil tests indicate unsuitable soils, frost susceptible soils, or presence of excessive ground moisture, a recommendation by the Soils Engineer for corrective work is required.
- b. The City minimum residential street width is 28 feet from back of curb to back of curb. Narrower streets may be allowed pursuant to the Subdivision Regulations in Chapter 5 of the City Code. Streets narrower than 28 feet back of curb to back of curb shall have parking restricted to one side. Private drives shall have "No Parking Fire Lane" signs installed on both sides of the drive per street detail plate **STRT-27**. Additional parking restrictions may be required on a case-by-case basis.
- c. The minimum grade for all new streets shall be three quarters of one percent (0.75%). The minimum grade for reconstructed streets shall be one half of one percent (0.50%). Grades within thirty (30) feet of intersections

and grades for the turnaround portion of a cul-de-sac street shall not exceed three percent (3%). Otherwise, the maximum allowable grades on City streets and driveways shall be as follows:

- 1) Minor Arterial – 5% maximum grade
 - 2) Collector – 6% maximum grade
 - 3) Local/Residential – 7% maximum grade
- d. Driveways shall be designed with a 2% minimum grade and 10% maximum grade. They also may not be placed within 5 feet of a sewer or water service unless approved by the City Engineer.
- e. A cul-de-sac must be provided for any dead end street 150 feet or longer. If there will be driveway access for any street that is dead-ended for future expansion, a temporary turn-a-round must be provided. See Standard Street Detail Plate **STRT-16**.
- f. The minimum diameter for a residential cul-de-sac is 90 feet from back of curb to back of curb. A commercial cul-de-sac shall have a minimum pavement diameter of 102 feet from back of curb to back of curb.
- g. Ridged 6" PVC drain tile is required at all low point catch basins and on the uphill side of all in grade catch basins. See Standard Storm Sewer Detail Plate **ST-9**.
- h. B6-18 concrete curb shall be installed along minor and major road arties, outlots, parks, play lots, around radiuses, development entrances or any sustained stretches with no driveways. Surmountable concrete curb shall generally be installed in all other areas where driveways are needed.
- i. Retaining walls:
- 1) All walls over four feet in height shall be designed by a qualified Professional Engineer registered in the State of Minnesota.
 - 2) A permit issued by the City's Building division is required to construct all walls.
 - 3) Retaining walls shall not be built within the street right-of-way or easements. All retaining walls, associated fences and landscaping will be considered private and shall be maintained by the property owners. If there is a storm sewer pipe penetration through the wall then a steel casing for the storm sewer pipe shall be installed per detail **ST-14**. All efforts should be made to avoid installing utilities under or thru a retaining wall.
 - 4) All materials (including sealing) shall be in accordance with MnDOT specifications. Acceptable materials for wall construction are concrete big block, modular block or boulders. No timber, limestone or sandstone maybe used for wall construction.
 - 5) All retaining walls which are determined by the City Engineer to support City infrastructure shall be of materials and constructed per detail **STRT-**

32. A minimum of 1.5:1 trench slope will be used in determining if a wall supports City infrastructure.
- 6) A fence shall be installed along the top of all walls 4 feet or taller.
- j. See the “Standard Detail Specifications for Street Construction” for Standard Detail Plates.

5. Drawings- Design Standards

- a. The following Standard Plates shall be used in the preparation of plans and specifications.
- 1) Project sign (City), Standard Detail Plate [DWG-1](#).
 - 2) Required Notes on Street & Storm Sewer Record Plans Standard Detail Plate [DWG-2](#).
 - 3) Required Notes on Watermain & Sanitary Sewer Record Plans Standard Detail [DWG-3](#).

6. Trails and Parks- Design Standards

- a. Pursuant to the Subdivision Regulations of the City Code, a sidewalk or trail is required along arterial and collector roadways consistent with the Comprehensive Plan. A sidewalk is required along one side of all local streets. And shall be installed along with the street construction.
- b. Install culverts as necessary to accommodate cross drainage. Shallow culverts shall use sand bedding pursuant to Storm Sewer Standard Detail Plate **ST-8**.
- c. Use twenty-foot (20') radius at all trail intersections.
- d. The following Standard Detail Plates shall be used in the preparation of plans and specifications.
- 1) Typical trail cross-sections, Standard Detail Plate STRT-15
 - 2) MNDOT Pedestrian Curb Ramp 01, Standard Detail Plate STRT-3
 - 3) MNDOT Pedestrian Curb Ramp 02, Standard Detail Plate STRT-4
 - 4) MNDOT Pedestrian Curb Ramp 03, Standard Detail Plate STRT-5
 - 5) MNDOT Pedestrian Curb Ramp 04, Standard Detail Plate STRT-6
 - 6) MNDOT Pedestrian Curb Ramp 05, Standard Detail Plate STRT-7
 - 7) MNDOT Pedestrian Curb Ramp 06, Standard Detail Plate STRT-8
 - 8) Park Signs, Standard Detail Plate STRT-26
 - 9) Seeding and over-seeding rates, Standard Detail Plate [SPP-1](#)
 - 10) Tree planting - balled and burlapped, Standard Detail Plate [SPP-2](#)
 - 11) Tree planting - bare root, Standard Detail Plate [SPP-3](#)
 - 12) Staking and wrapping trees, Standard Detail Plate [SPP-4](#)
 - 13) Pruning trees, Standard Detail Plate [SPP-5](#)
 - 14) Pruning trees, Standard Detail Plate [SPP-6](#)

- 15) Pruning large branches, Standard Detail Plate [SPP-7](#)
- 16) Pruning shrubs and established plants, Standard Detail Plate [SPP-8](#)
- 17) Tree protection and supporting branches, Standard Detail Plate [SPP-9](#)

IV. MISCELLANEOUS

- a. It is the Developer's responsibility to make arrangements for receiving water from public or private sources, secure necessary permits and pay regular charges. City water may be purchased at the Public Works facility, [14900 23rd Ave N](#) or at the Zachary Lane Treatment Plant, [4295 Zachary Lane N](#). Under no circumstances shall hydrants be used to supply water.
- b. Contractors shall not operate existing gate valves or hydrants.
- c. Disposal of any wastewater or any test water into the City sanitary sewer system is not permitted.
- d. A plan for the routing of construction traffic shall be submitted to the City Engineer for approval. If alternative major streets are available, the use of local City streets is prohibited. City streets that are utilized for access or egress to the construction site shall be kept free of dirt and other debris resulting from said construction. The Developer shall maintain adequate control of dust.
- e. All site grading must be completed, certified by the project Engineer and all "Off Road" grading equipment removed from the site before starting any public utility work.
- f. It is the responsibility of the Developer to protect and leave undisturbed those markers or monuments set for the subdivision of land.
- g. Any material or labor supplied by the contractor or developer that is rejected by the City Engineer as defective or unsuitable shall be promptly removed, disposed of off the job site, and replaced with approved material. The rejected work shall be done anew to the specifications and approval of the City.
- h. The developer and/or his contractor shall immediately repair or replace at his own expense any defective workmanship or material of which he is notified during the construction period, or within the one or two year maintenance period after the date of final acceptance of the work, regardless of the approval and acceptance of the work.
- i. The standard ten (10) foot drainage and utility easement adjacent to the street right-of-way shall be cleared, grubbed and graded for the placement of utilities. The only exception will be any hardwood trees or others that the City Forester authorizes to remain standing. See Standard Street Construction Detail **STRT-30**.

- j. Pursuant to the Right-of-Way Ordinance (City Code Section 800 Subd. 5. A.), a permit is required to work in the public right-of-way. Contact the City's Engineering Division to apply for the permit or for any questions at (763) 509-5500. New construction for sewer, water, storm sewer and street work would be exempt in most situations. Small utilities installation, irrigation installation, landscaping, etc. are required to obtain a permit.
- k. The City Engineer shall be notified at least 48 hours prior to commencing any work. Phone # (763) 509-5500. Contractors are subject to being shut down and or having work rejected if proper notification is not given to the City.

Work shall not commence before 7:00 a.m. nor extend beyond sundown Monday through Friday. On Saturdays, work hours are from 8:00 a.m. to 6:00 p.m. No work is permitted on Sundays or Holidays unless authorized by the City. Existing roadways shall not be restricted between 7:00 a.m. & 9:00 a.m. and 3:00p.m. & 6:00 p.m. unless approved by the City Engineer.

The definition of "Work" also includes the starting of equipment and the delivery of materials to the job site.

- l. Pursuant to the Subdivision Regulations of the City Code, streetlights shall be installed at all intersections and at other locations, as required by the City Engineer. Streetlights shall be installed by Xcel Energy or Wright – Hennepin Electric, and shall include maintenance of the streetlights.

V. - STANDARD PLATE

CITY OF PLYMOUTH [6"]

IMPROVEMENT PROJECT: [3"]
(PROJECT NAME) [3"]
(PROJECT NO.) [2-1/2"]

PROCEED WITH CAUTION [6"]

FOR INFORMATION CALL: [2-1/2"]
PROJECT HOTLINE NO. (763) 509-55XX [WHERE APPLICABLE]
PROJECT WEBSITE WWW.PLYMOUTHMN.GOV [WHERE APPLICABLE]

(NAME OF CONSULTING ENGINEER) CITY ENGINEERING DIVISION:
(NAME OF PROJECT MANAGER) [2-1/2"] (CITY REPRESENTATIVE)
(PHONE NO.) PHONE NO. (763) 509-5500

(CONTRACTOR'S NAME) SCHEDULED COMPLETION DATE:
(ADDRESS) [2-1/2"] (DATE)
(LOCAL PHONE NO.)

NOTE:

Sign shall be 4' x 6' with a white background with black letters, (no hand lettering) and of proper height to be readily visible from an automobile, and located as directed by engineer. Sign shall be mounted on 4"x 4" posts

() Project Specific Information



STANDARD DETAILS
STANDARD CITY PROJECT SIGN
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
DWG-1
REVISED 3-11

THE CITY OF PLYMOUTH REQUIRES THAT THE CONTRACTOR'S NAME, TYPICAL STREET CROSS SECTION AND THE FOLLOWING NOTES AND STATEMENTS BE PLACED ON EACH STREET OR STORM SEWER RECORD PLAN SHEET.

RECORD PLAN NOTES:

1. ALL HYDRANT BENCHMARKS ARE TOP NUT OF HYDRANT.
2. DISTANCES, ELEVATIONS AND TIES ARE BASED ON FIELD MEASUREMENTS TAKEN AFTER CONSTRUCTION.

RECORD PLAN COMPLETED BY: _____

DATE: _____



STANDARD DETAILS
REQUIRED NOTES ON STREET
AND STORM SEWER RECORD PLAN
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
DWG-2
REVISED 3-11

THE CITY OF PLYMOUTH REQUIRES THAT THE CONTRACTOR'S NAME AND THE FOLLOWING NOTES AND STATEMENTS BE PLACED ON EACH WATERMAIN OR SANITARY SEWER RECORD PLAN SHEET.

RECORD PLAN NOTES:

1. ALL HYDRANT BENCHMARKS ARE TOP NUT OF HYDRANT.
2. DISTANCES, ELEVATIONS AND TIES ARE BASED ON FIELD MEASUREMENTS TAKEN AFTER CONSTRUCTION. WYE LOCATIONS SUPPLIED BY CONTRACTORS.
3. ALL TIES AND DISTANCES ARE TO THE CENTER OF SURFACE STRUCTURES.
4. ALL HYDRANTS AND HYDRANT GATE VALVES ARE RETAINED AND TIED BACK TO THE WATERMAIN TEE BY MEANS OF APPROVED MEGALUGS UNLESS OTHERWISE NOTED.
5. ALL SEWER SERVICES ARE LOCATED 3 FEET DOWNSTREAM OF WATER SERVICES IF SEWER AND WATER ARE IN THE SAME TRENCH.
6. ALL WATER SERVICES ARE 1 INCH H.D.P.E. AND ALL SEWER SERVICES ARE 4 INCH P.V.C. UNLESS OTHERWISE SPECIFIED.
7. ALL SEWER AND WATER SERVICES ARE EXTENDED 10 FEET BEYOND THE PROPERTY LINE UNLESS OTHERWISE NOTED.

RECORD PLAN COMPLETED BY: _____

DATE: _____



STANDARD DETAILS
REQUIRED NOTES ON WATERMAIN
AND SANITARY SEWER RECORD PLAN
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
DWG-3
REVISED 3-11

SEED RATES, TIMES AND SUGGESTIONS

BEST TIME TO SEED OR OVERSEED LISTED IN ORDER OF HIGHEST GERMINATION RATES:

1. AUGUST 15 TO SEPTEMBER 15
2. NOVEMBER 15 TO DECEMBER 15 (DORMANT SEEDING)
3. APRIL 15 TO MAY 15

NEW SEEDING AND OVER SEEDING RATES: 6 LB. PER 1000 SQ. FT. (261 LBS. PER ACRE)

- 30% PARADE KENTUCKY BLUE
- 20% AQUILA KENTUCKY BLUE
- 20% PARK KENTUCKY BLUE
- 30% PERENNIAL RYE—DELRAY

DIVIDE SEED IN HALF AND SOW IN TWO DIFFERENT DIRECTIONS.

OVERSEEDING SUGGESTIONS:

1. CLIP GRASS TO 1" HEIGHT OR LESS.
2. AERATE AREA WITH DRAG MAT TO BREAK UP PLUGS.
3. REMOVE DEBRIS
4. FERTILIZE WITH PHOSPHOROUS FREE STARTER FERTILIZER AT RECOMMENDED RATE.
5. TOP DRESS AREA IF NECESSARY.
6. SEED AT SUGGESTED RATE WITH SEEDER THATCHER MACHINE PULLING DRAG MAT.
7. WATER



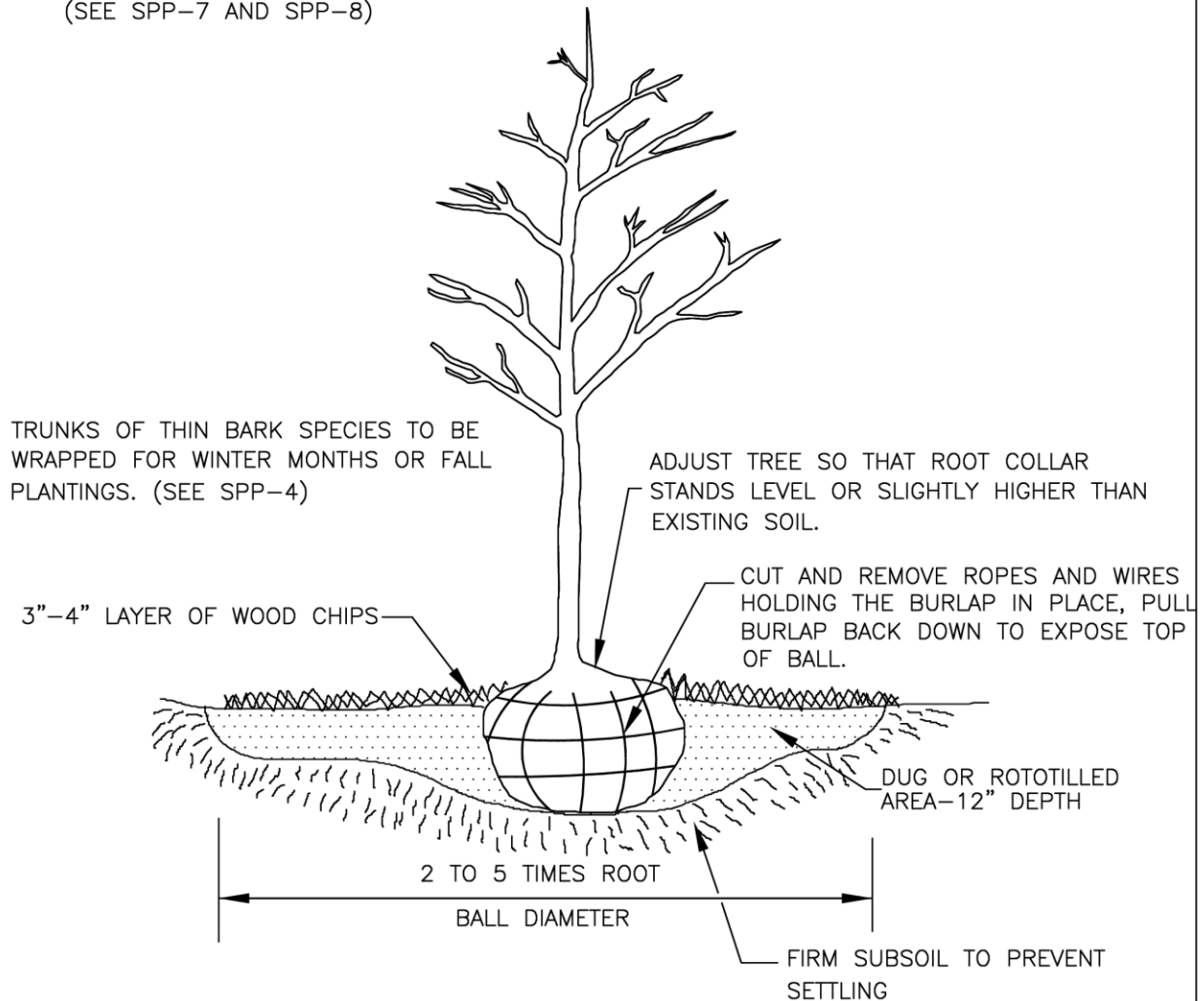
STANDARD DETAILS
SEEDING AND OVERSEEDING RATES
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
SPP-1
REVISED 3-11

STAKES NOT RECOMMENDED UNLESS THE TRUNK EASILY WAIVERS 3"-5". IF STAKES ARE NEEDED SEE SPP-4

PRUNING SHOULD BE LIMITED TO ONLY BROKEN, DEAD, OR DAMAGED LIMBS AND SHOULD NOT CHANGE THE APPEARANCE OF THE TREE.
(SEE SPP-7 AND SPP-8)



STANDARD DETAILS
TREE PLANTING-BALLED AND BURLAPED
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
SPP-2
REVISED 3-11

TRUNKS OF THIN BARKED SPECIES SHOULD BE WRAPPED FOR WINTER MONTHS, OR FALL PLANTING. (SEE SPP-4)

PRUNING SHOULD BE LIMITED TO DEAD, BROKEN, OR DAMAGED LIMBS. (SEE SPP-5 THROUGH SPP-7)

STACKING NOT RECOMENDED. IF NEEDED SEE SPP-4.

ADJUST TREE SO THAT ROOT COLLAR STANDS LEVEL OR SLIGHTLY HIGHER THAN EXISTING SOIL.

CUT AND REMOVE DAMAGED ROOTS, FULLY EXTEND ROOT MASS

3"-4" LAYER OF WOOD CHIPS

DUG OR ROTOTILLED AREA-12" DEPTH

FIRM SUBSOIL TO PREVENT SETTLING

2 TO 5 TIMES
ROOT DIAMETER



STANDARD DETAILS
TREE PLANTING-BARE ROOT
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
SPP-3
REVISED 3-11

STAKES AND GUY WIRES SHOULD BE USED ONLY IF SUPPORT IS NECESSARY. WHEN USING, AVOID COMMON PROBLEMS BY FOLLOWING THESE GUIDELINES:

IF MAIN STEM DROOPS, FIND THE BEST PLACE FOR SUPPORT TIES BY MOVING YOUR HAND UP TO THE TRUNK TO LOCATE THE POINT ABOVE WHICH THE TOP CAN STAND UP ON ITS OWN. PLACE THE SUPPORT TIES ABOUT 6" ABOVE THAT POINT.

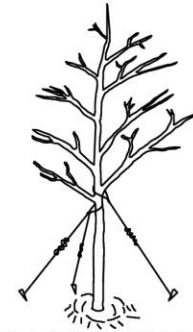
TIES CAN BE MADE MANY WAYS, BUT A LOOSELY-FITTED FIGURE 8 TIE MADE OF POLYETHYLENE, CLOTH OR WEBBED STRAP IS EASY TO

INSTALL, PROVIDES GOOD SUPPORT AND CUSHIONS THE TREE FROM RUBBING AGAINST THE STAKE. USING TWO TIES WILL ALSO MINIMIZE THE CHANCE OF BARK DAMAGE FROM RUBBING.

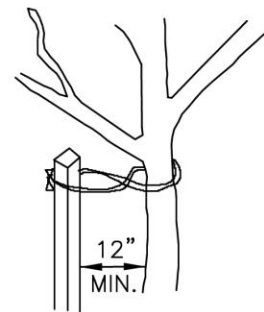
REGARDLESS OF THE TIE USED, ALLOW SLACK FOR SWAY.

AVOID DRIVING STAKES THROUGH THE ROOT BALL, OR USING STAKES WITH FLANGES THAT WILL BREAK ROOTS WHEN REMOVED.

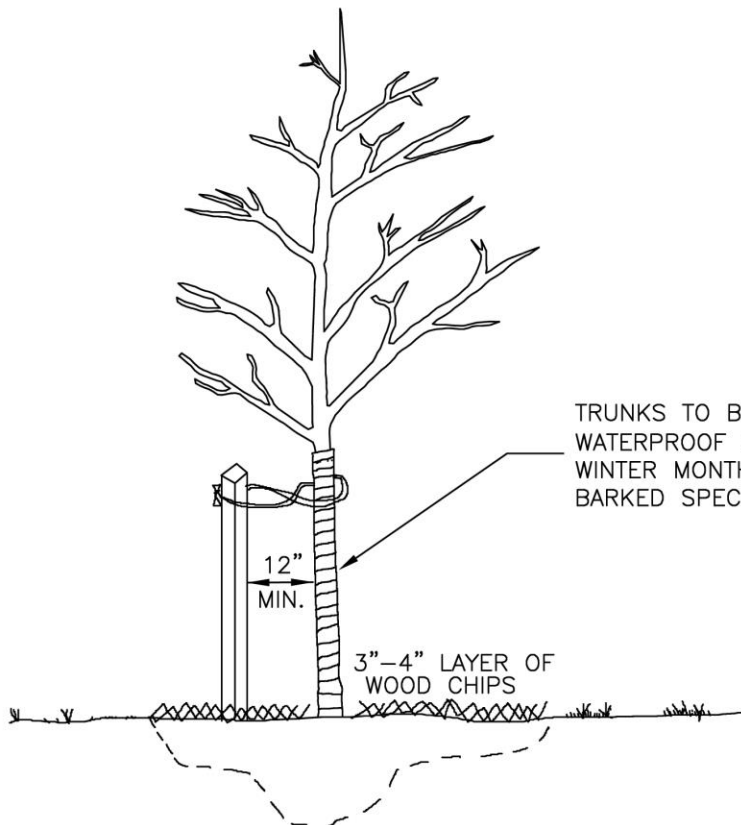
REMOVE SUPPORT TIES AFTER ONE OR TWO YEARS.



FOR LARGE TREES. SPRINGS IN THE GUY PROVIDE FLEXIBILITY.



FOR NARROW SPACES



TRUNKS TO BE WRAPPED WITH 3"-4" STRIPS OF WATERPROOF CRINKLED KRAFT TREE WRAP FOR WINTER MONTHS OR FALL PLANTINGS ON THIN BARKED SPECIES (MAPLES, LINDENS, CRABS, ETC.)



STANDARD DETAILS
STAKING AND WRAPPING TREES
CITY OF PLYMOUTH

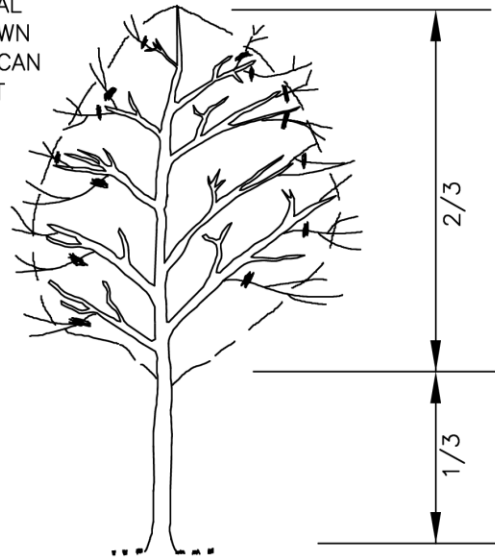
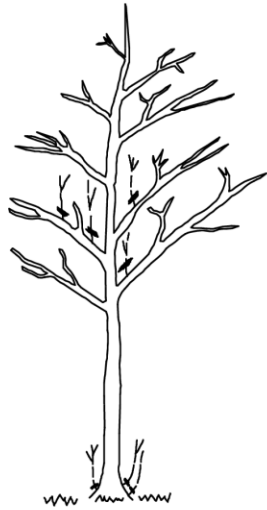
PUBLISHED
1-20

CITY PL. NO.
SPP-4
REVISED 3-11

NEWLY PLANTED TREES ARE PRUNED AND TRIMMED TO RETAIN THEIR NATURAL FORMS. ONLY DEAD, BROKEN OR DAMAGED LIMBS SHOULD BE REMOVED AT THE INITIAL PLANTING.

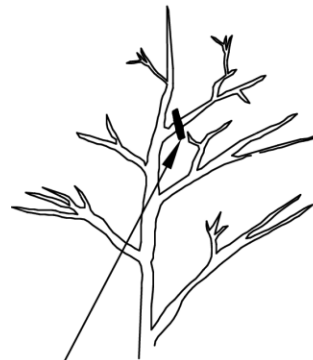
INGROWERS, PROTRUDERS AND CROWN RATIO

WHEN A CROWN IS DENSE, LOOK FOR LIMBS THAT TURN INWARD, AND THOSE THAT EXTEND BEYOND THE "NATURAL" OUTLINE OF THE CROWN. PRUNE AT THE TRUNK OR DOWN TO AN APPROPRIATE LATERAL BRANCH. OVER-PRUNING CAN DAMAGE OR EVEN KILL YOUR TREE. ALWAYS MAINTAIN AT LEAST $\frac{2}{3}$ OF THE TREE AS THE LIVE CROWN.



WATERSPROUTS AND SUCKERS

THESE "PARASITE" SPROUTS CAN OCCUR AT THE BASE OR INSIDE THE CROWN. THEY ARE RAPIDLY GROWING, WEAKLY ATTACHED AND UPRIGHT. USUALLY THEY USE MORE ENERGY THAN THEY RETURN TO THE TREE IT IS BEST TO REMOVE THEM AS SOON AS POSSIBLE WHEN IT IS OBVIOUS THEY ARE VIGOROUS SPROUTS.



DOUBLE LEADERS

PROTECT THE LEADERS FROM COMPETITION. IN TREES WITH CO-DOMINANT LEADERS, REMOVE THE ONE WITH A CROOK OR OTHER DEFECTS, OR THAT CREATES A LOP-SIDED APPEARANCE.

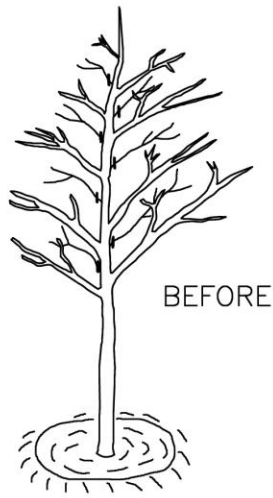


STANDARD DETAILS
PRUNING TREES
CITY OF PLYMOUTH

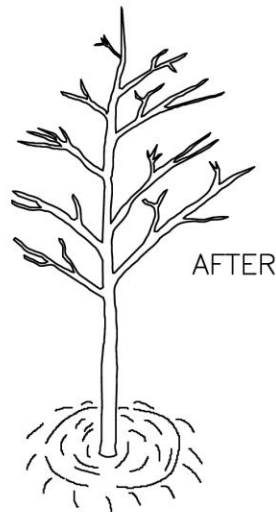
PUBLISHED
1-20

CITY PL. NO.
SPP-5
REVISED 3-11

NEWLY PLANTED TREES ARE PRUNED AND TRIMMED TO RETAIN THEIR NATURAL FORMS. ONLY DEAD, BROKEN OR DAMAGED LIMBS SHOULD BE REMOVED AT THE INITIAL PLANTING.



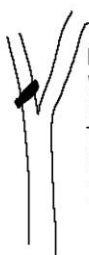
BEFORE



AFTER

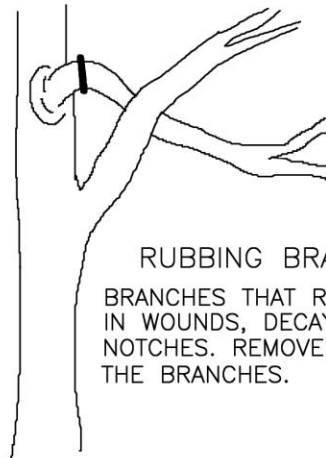
THINNING AND SPACING

MOST TREES BENEFIT FROM THINNING—REMOVING A PORTION OF THE LIMBS THAT COMPETE FOR SPACE AND LIGHT. A GOOD RULE OF THUMB IS TO EVENLY SPACE LATERALS, 8–12 INCHES APART IN THE YOUNG TREE, IS A GOOD RULE OF THUMB TO HELP ASSURE AN IDEAL "LADDER" AT MATURITY.



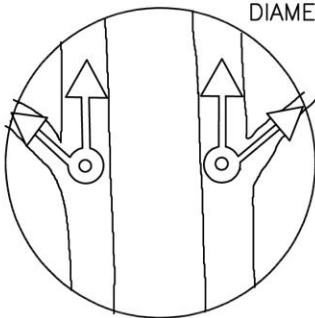
BRANCH ANGLES AND SIZE

NARROW ANGLES SIGNAL A POINT OF FUTURE WEAKNESS, TWO BRANCHES GROWING AGAINST EACH OTHER, SIMPLY REMOVE ONE OF THE TWO BRANCHES. FOR STRENGTH, THE IDEAL BRANCHING ANGLE APPROXIMATES 10 OR 2 O'CLOCK.



RUBBING BRANCHES

BRANCHES THAT RUB RESULT IN WOUNDS, DECAY AND NOTCHES. REMOVE ONE OF THE BRANCHES.



LATERAL BRANCHES SHOULD BE NO MORE THAN $\frac{1}{2}$ TO $\frac{3}{4}$ THE DIAMETER OF THE TRUNK.



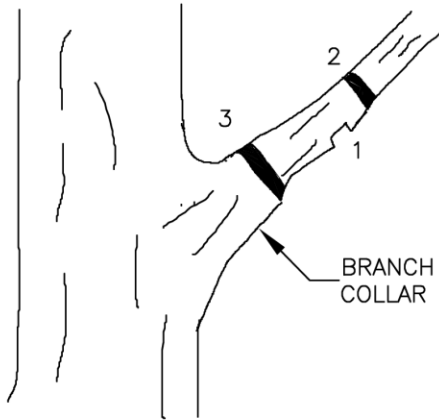
STANDARD DETAILS
PRUNING TREES
CITY OF PLYMOUTH

PUBLISHED
1–20

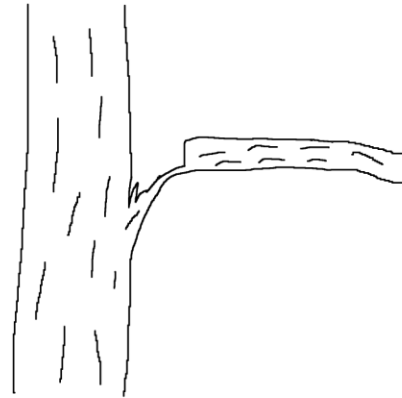
CITY PL. NO.
SPP–6
REVISED 3–11

PRUNING PRINCIPLE

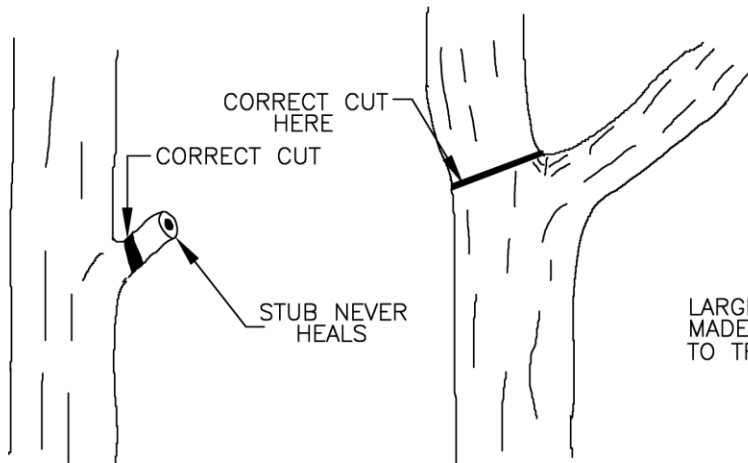
1. FOLLOW NUMERICAL SEQUENCE (AS DIAGRAMED) WHEN MAKING PRUNING CUTS.
2. DO NOT LEAVE STUBS
3. DO NOT CUT INTO THE BRANCH COLLAR.



CORRECT
PRUNING



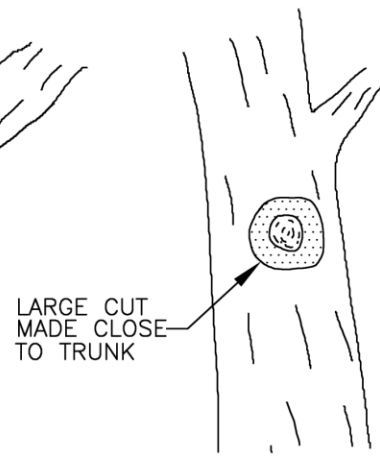
AVOID THIS



STUB



UPRIGHT
BRANCH



CUT
HEALING



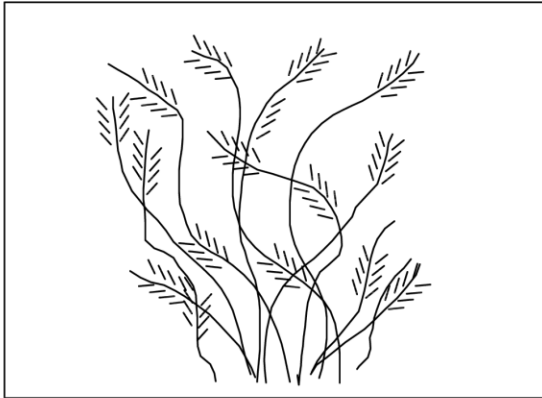
STANDARD DETAILS
PRUNING LARGE BRANCHES
CITY OF PLYMOUTH

PUBLISHED
1-20

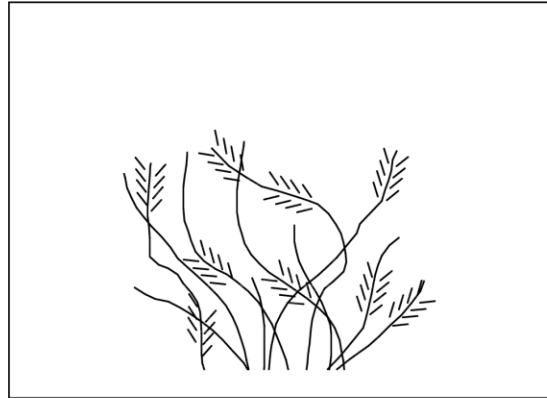
CITY PL. NO.
SPP-7
REVISED 3-11

LARGE 8" – "LEGGY" SHRUB PRESENTS AN OPEN BARE EFFECT.

PRUNED TO ALLOW NEW SHOOTS TO DEVELOP.



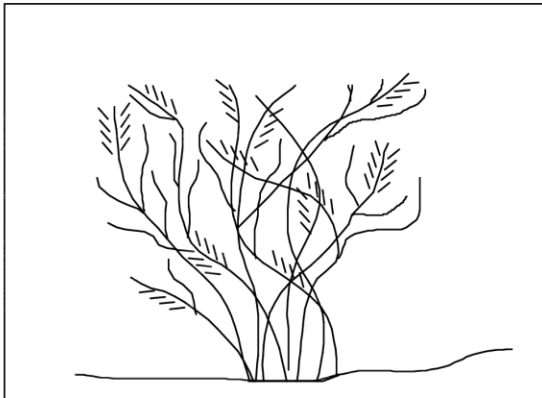
BEFORE PRUNING



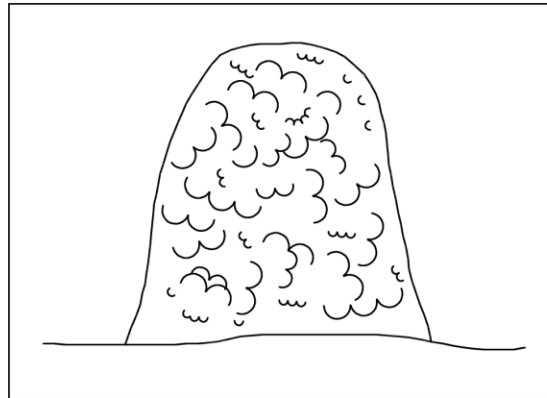
CORRECT PRUNING

SHRUB "SHEARED", ALL BRANCHES CLIPPED AT A UNIFORM HEIGHT WITHOUT REGARD TO NATURAL HABITS.

ALL HEDGES MUST BE SHEARED WIDER AT THE BOTTOM THAN TOP TO ALLOW SUNLIGHT TO REACH LOWER BRANCHES.



INCORRECT PRUNING



HEDGE
CORRECT PRUNING

ORNAMENTAL SHRUBS ARE PRUNED TO ENABLE THEM TO PRODUCE MORE FLOWERS, TAKE SOME DESIRED FORM AND FOR REMOVAL OF UNUSUAL OR INJURED GROWTH.

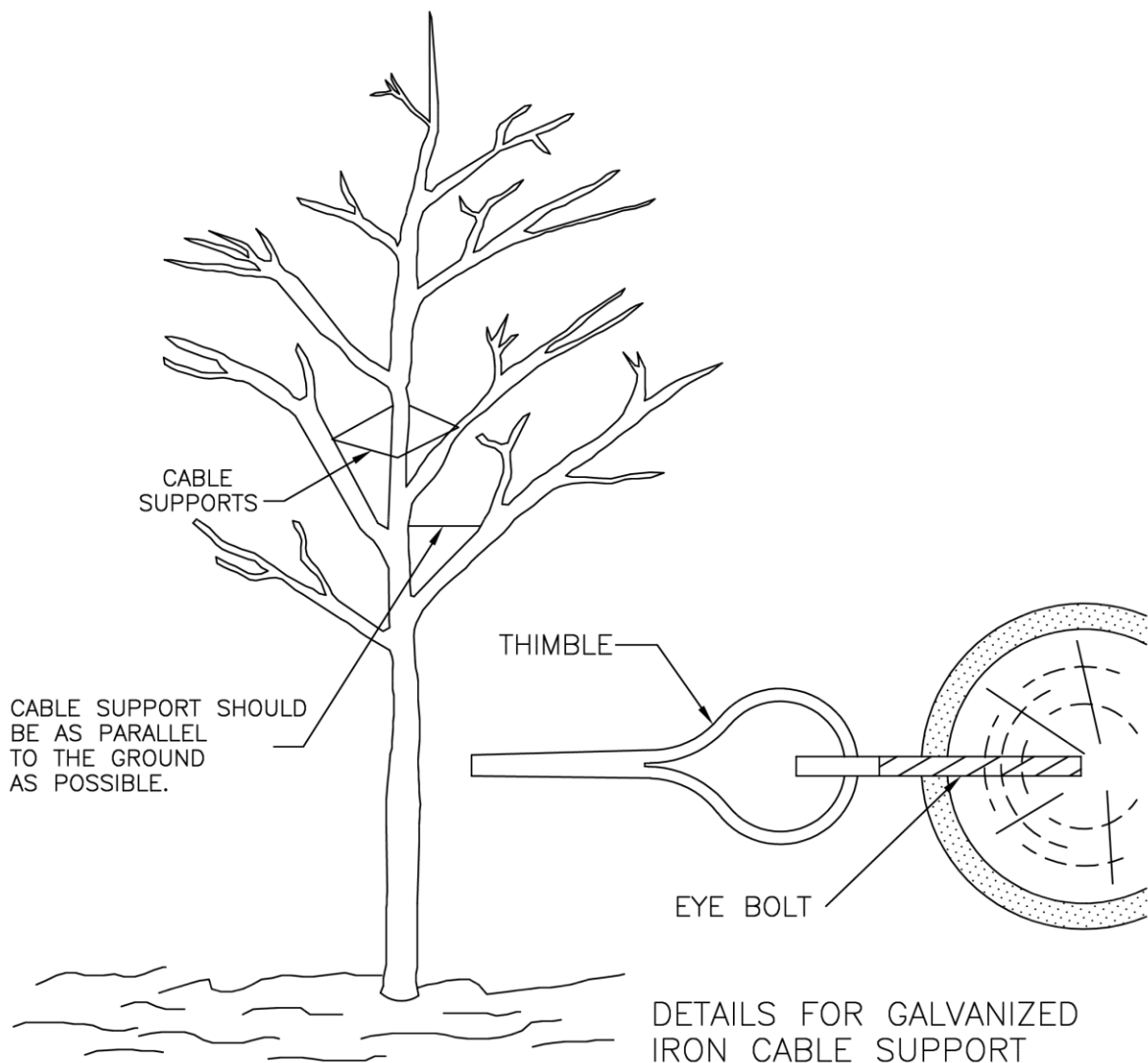
HOW AND WHEN TO PRUNE FLOWERING PLANTS WILL DEPEND UPON A KNOWLEDGE OF THE HABIT AND FLOWERING PERIOD OF INDIVIDUAL PLANTS.



STANDARD DETAILS
PRUNING SHRUBS AND ESTABLISHED PLANTS
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
SPP-8
REVISED 3-11



TREES FREQUENTLY HAVE BEEN PERMITTED TO DEVELOPE TWO OR THREE TRUNKS. AS A RESULT OF THIS, SPLITTING OF CROTCHES MAY OCCUR.

CAREFUL PRUNING AND EARLY TRAINING MAY ELIMINATE THIS DEFECT. HOWEVER, WHEN IT EXISTS IN GROWN TREES IT IS ADVISABLE TO USE GALVANIZED WIRE CABLE SUPPORTS.



STANDARD DETAILS
TREE PROTECTION—SUPPORTING BRANCHES
CITY OF PLYMOUTH

PUBLISHED
1-20

CITY PL. NO.
SPP-9
REVISED 3-11

APPENDIX A – EROSION CONTROL ORDINANCE

Section 425 - Grading and Erosion Control Plan

425.01. Grading and Erosion Control Plan

Subd. 1. A satisfactory erosion control and grading plan consistent with the Minnesota Stormwater Manual must be approved by the City Engineer before a grading or building permit is issued for construction, if the construction will result in disturbing the soil.

Subd. 2. The grading and erosion control plan must provide spot elevations of proposed grades in relation to existing grades on the subject property and adjacent land. Areas where the finished slope will be steeper than five (5) units horizontal to one (1) vertical shall be specifically noted. Also, location and type of erosion control devices shall be clearly labeled.

Subd. 3. Every effort shall be made to minimize disturbance of existing ground cover. No grading or filling shall be permitted within forty feet (40') of the ordinary high water mark of a water body unless specifically approved by the City. To minimize the erosion potential of exposed areas, restoration of ground cover shall be provided within five (5) days after completion of the grading operation.

Subd. 4. Every effort shall be made during the building permit application process to determine the full extent of erosion control required. However, the City Engineer may require additional controls to correct specific site related problems as normal inspections are performed.

Subd. 5. All erosion control noted on the approved plan shall be installed prior to the initiation of any site grading or construction. Noncompliance with the grading and erosion control plan shall constitute grounds for an order from the City to halt all construction.

Subd. 6. All grading and construction activity that results in disturbance of the ground shall comply with Minnesota Pollution Control Agency's General Permit to Discharge Stormwater Associated with construction activity No. MN – R100001 and the Minnesota Stormwater Manual.

Section 526 – Erosion Control

526.01. Erosion Control Plan. Prior to commencing any earth disturbing activity in a subdivision, the subdivider shall submit an erosion control plan for approval by the City Engineer. The plan shall be approved if it complies with the City's Zoning Ordinance and the requirements contained herein.

526.03. Erosion Control Measures.

Subd. 1. The following erosion control measures are required for an erosion control plan:

(a) The plan shall be suited to the topography and soils so as to create the least erosion potential.

(b) The land shall be developed in increments of workable size on which adequate controls of erosion and siltation can be provided and maintained during the construction period. Grading operations and other land disturbing operations shall be staged so that the area being developed is not exposed for long periods of time without stabilization.

(c) Temporary vegetation and/or mulching shall be used to protect the areas exposed during the development. No area shall be left denuded for a period longer than fourteen (14) days after initial site grading and other land disturbing operations. These areas shall be seeded, mulched and stabilized with erosion control netting or blanket acceptable to the City Engineer. Erosion control blanket shall be used on slopes of 3:1 or steeper.

(d) Permanent vegetation and structures shall be installed within thirty (30) days after completion of initial grading. If grading is not completed until after the planting season has expired, temporary erosion control measures, including dormant seeding and mulching, shall be implemented.

(e) Sediment basins (debris basins, desilting basins, or silt traps) shall be installed and maintained to remove sediment from runoff waters from the land undergoing development. Storm sewer inlets shall be provided with debris guards and microsilts basins to trap sediment and avoid possible damage from blockage. The silt shall be removed when necessary. If sediment/siltation measures taken are not adequate and result in downstream sediment, the subdivider shall be responsible for cleaning out or dredging downstream storm sewers and ponds as necessary.

(f) Before grading is commenced, all control measures as shown on the approved plan shall be installed.

(g) Immediately after curb and gutter has been placed, cured and backfilled, City approved erosion control measures shall be installed directly behind the curb. This requirement does not alter the subdivider's responsibility for sodding the boulevard.

(h) Erosion control practices shall comply with Minnesota's Pollution Control Agency's general permit to discharge storm water associated with construction activity No. MN-R100001

(i) The subdivider shall be responsible for cleaning and maintenance of the storm sewer system [including ponds, pipes, catch basins, culverts, and swales] within the subdivision and the adjacent off-site storm sewer system that receives storm water from the subdivision. The subdivider shall follow all instructions it receives from the City concerning the cleaning and maintenance of the storm sewer system. The subdivider's obligations under this paragraph shall end after the erosion control is complete and financial guarantees have been released.

(j) The subdivider shall be responsible for cleaning all streets in the subdivision and adjacent to the subdivision from silt and dirt from the subdivision.

Subd. 2. Financial Guarantee:

(a) In order to guarantee compliance with erosion control measures, a financial guarantee in the form of a non-interest bearing cash escrow or letter of credit satisfactory to the City in the amount of fifteen hundred dollars (\$1,500) per acre shall be provided to the City before work is commenced. Up to two-thousand (\$2,000) of this amount shall be by cash deposit to be held by the City of Plymouth in a non-interest bearing account. The financial guarantee shall remain in place until all the subdivider's obligations under the erosion control plan have been satisfied.

(b) If the City draws upon the financial guarantee, the subdivider shall within ten (10) days of the draw, deposit with the City additional security of the same type and amount that the City has drawn. No further inspections will be conducted, no new building permits will be issued, and all work shall stop within the development until the cash deposit for erosion control is restored to the pre-draw balance.

Subd. 3. Street Cleaning:

Prior to commencement of grading, the subdivider shall enter into a contract with an unrelated third party to scrape and sweep the streets in the subdivision and on abutting streets from soil and silt deposited on the streets. At a minimum, scraping and sweeping shall take place on a weekly basis. The City shall be furnished a copy of the contract. The contract shall provide that the contract cannot be canceled without at least thirty (30) days advance written notice to the City. The contract shall further provide that the City may order cleaning of the streets and that the subdivider shall pay the cost. If the subdivider fails to do so, the City may

draw on the subdivider's financial guarantee with the City and use it to provide payment for the cleaning.

Subd. 4. Enforcement:

(a) The City may issue a stop work order halting all development work and building construction for noncompliance with the erosion control plan.

(b) The City may draw down the posted financial guarantee and perform any work necessary to achieve compliance with the erosion control plan. The City will endeavor to give the subdivider advance notice of such action.

(c) The subdivider shall pay to the City an administration fee of five-hundred dollars (\$500.00) for each violation of the erosion control plan. If the subdivider does not promptly pay the fee, the City may draw upon the posted financial guarantee to pay it.

(Ord. 2012-62, 02/28/2012)

APPENDIX B

RECORD PLAN STANDARD

Street and Utilities Record Plan Standards **For The City of Plymouth**

Information Required On All Record Plan Sheets

1. Contractors name and address
2. "Record Plan" in the revision block and lower right corner
3. Typical street section for each unique street
4. Trail and sidewalk typical sections (if applicable)
5. Elevations to top nut of all hydrants
6. Include City Project number on every plan sheet

*****Revise the original AutoCAD contract drawings noting the changes*****

Crossing out of incorrect information (elevations, distances, etc.) will not be allowed on record plans. Incorrect information must be cleanly removed and replaced with the correct record plan information.

Contact City of Plymouth Engineering Division (763) 509-5500 for specific questions regarding utility record plan requirements.

Information Required On All Sanitary and Watermain Sheets

1. Structures
 - a. Elevations for top of casting and all inverts.
 - b. Jack –bored casings (type, size, elevation and stationing).
 - c. Force mains-tie all major bends.
 - d. Lift stations must be as-built.
 - e. All structures shall be identified as type, size (diameter), etc. on the plan or profile view.
2. Sanitary Services
 - a. Size, material type and invert elevation of all sanitary services shall be shown.
 - b. Risers (if installed)-the height of each shall be indicated on the plan and drawn on the profile.
 - c. If the sanitary sewer service lies in a separate trench from the water service, show (2) swing ties using same priority as gate valves.
 - d. Note if the sanitary sewer has tracer wire.
 - e. All sanitary services will be noted on the plans with an "S" preceding the stationing.
 - f. Stationing must be provided as measured from the nearest downstream sanitary manhole.
3. Waterman Services
 - a. Size and material type of all watermain services shall be shown.
 - b. All watermain services shall be noted on the plans with a "W" preceding the stationing.

- c. Stationing must be provided as measured from the nearest downstream sanitary manhole.
- d. All watermain gate valves shall be tied with at least (2) ties using the following priority:
 - (Hydrants, manholes, catch basins first) power poles, light poles and small utility pedestals second. Ties can go up to 200' in length.
- e. Watermain fitting stations will be shown on the plan or profile view of the plan sheets.
- f. Show (2) swing ties from the end of the watermain service using the same priority as for gate valves.

Information required on all Street and Storm Sewer Sheets

1. Structures
 - a. Elevations for top of casting and all inverts
 - b. Jack –bored casings (type, size, elevation and stationing)
 - c. All structures shall be identified as type, size (diameter), etc. on the plan or profile view
2. Show all storm sewer mainlines and laterals on the plan and profile sheets
3. Show areas utilizing geotextile fabric on the plans using hatches and text the stationing
4. Show material type, size and location of drain tile.
5. Show (2) swing ties from each drain tile clean out.
6. Show any casings installed for irrigation or small utilities
7. Show all final street grades on profile sheets.
8. Show the right-of way width for each street.
9. Show the back-of-curb width for each street.
10. Show all signage installed on the streets.

Submittal of Record Plans

1. Submit a PDF drawing file created from the original AutoCAD drawings to the City of Plymouth Engineering Div. for review and comments. The review set will be sent back noting any needed changes.
2. **AFTER** final comments from the City have been completed, supply the City with: One complete set on a CD, DVD, Drop Box or Email of the "Record Plans" in **AutoCAD (.DWG & PDF)** file formats by individual, full size sheets, plot configuration files **(.CTB)** and the Point-Northing-Easting-Zenith-Descriptor **(PNEZD)** comma delineated ASCII data file for all elements in the project using Hennepin Co. Coordinates.

(Revised 3-26-18)

Grading Record Plan Standards **For The City of Plymouth**

Information Required On All Record Plan Sheets

(Revised 3-28-18)

- Contractors name and address
- "Record Plan" in the revision block and lower right corner
- The name and date of the record plan preparer
- Include City Project number on every plan sheet

*****Revise the original AutoCAD contract drawings noting the changes*****

Contact City of Plymouth Engineering Division (763) 509-5500 for specific questions regarding grading record plan requirements.

Information required on all Pond, Grading and Rain Garden Sheets

Information is required as outlined in the Developers Agreement in addition to the following:

1. Within thirty (30) days after completion of the grading, the Developer shall provide the City with a "record" grading plan certified by a registered land surveyor or engineer that all ponds, swales, and ditches have been constructed on public easements or land owned by the City. The "record" plan shall contain site grades and field verified elevations of the following: a) cross sections of ponds; b) location and elevations along all swales, emergency overflows, wetlands, wetland mitigation areas (if any), ditches, locations and dimensions of borrow areas/stockpiles; c) lot corner elevations and house pads; d) top and bottom of retaining walls.
2. (1) Spot elevation shot for every 100 square feet from pond bottom to two (2) feet above the High Water Level (HWL).
3. Over lay as-built shots (In contrasting color) on previously approved master grading, pond and rain garden plan sheets
4. Note any changes in contours
5. Include final elevations of storm drainage structures and inverts
6. Include final elevations of EOF's
7. At the time of the final street construction and before acceptance of the streets the Developer shall submit proof of verification at critical locations, that all ponds, swales and ditches are still graded per the approved development grading plan.
8. Provide a survey of all drainage system features such as EOF's, swales, ponds, storm water BMPs, storm structure rim elevations, F.E.S inverts, drain tile structure elevations etc. after all lot building is completed and final stabilization of the site is completed. The list of features to be surveyed above is not comprehensive and will be determined by the Engineering Department for each project.
9. Provide volume calculations for all basins that show the design verses as-built info.
10. A professional engineer shall provide certification that all new basins are installed and functioning as designed.

Submittal of Record Plans

1. Submit a PDF drawing file created from the original AutoCAD drawings to the City of Plymouth Engineering Div. for review and comments. The review set will be sent back noting any needed changes.

2. **AFTER** final comments from the City have been completed, supply the City with: One complete set on a CD, DVD, Drop Box or Email of the "Record Plans" in AutoCAD (.DWG & PDF) file formats by individual, full size sheets, plot configuration files (.CTB) and the Point-Northing-Easting-Zenith-Descriptor (PNEZD) comma delineated ASCII data file for all elements in the project using Hennepin Co. Coordinates.