

# ENGINEERING DESIGN STANDARDS

For planning design purposes, design standards are helpful, if not necessary. Here are the standards for Princeton.

## A. Street Design Standards

1. Proposed streets shall conform to all State road and County highway plans as have been prepared, adopted, and/or filed as prescribed by law.
2. Streets shall be logically related to the topography so as to produce usable lots and reasonable grades.
3. Access shall be given to all lots and portions of the tract in the subdivision and to adjacent unsubdivided parcels unless the topography clearly indicates that such connection is not feasible. Reserved strips and landlocked areas shall not be created.
4. The arrangement of streets in new subdivisions shall make provision for the appropriate continuation of the existing streets in adjoining areas.
5. Where adjoining areas are not subdivided but may be subdivided, the arrangement of streets in a new subdivision shall make provision for the proper projection of streets into adjoining areas by carrying the new street to the boundaries of the new subdivision at appropriate locations.
6. Minor streets shall be laid out to discourage their use by through traffic. Thoroughfares shall be reserved for through traffic by providing marginal access streets, interior streets for serving lots, or other means.
7. Half or partial streets will not be permitted, except where essential to reasonable subdivision of a tract in conformance with the other requirements and standards of these regulations and where, in addition, satisfactory assurance for dedication of the remaining part of the street can be secured.
8. Wherever a tract to be subdivided adjoins an existing half or partial street, the part of the street within such tract shall be platted.
9. Dead end streets shall be prohibited, except as stubs to permit future street extension into adjoining tracts, or when designated as cul-de-sac streets.
10. Private streets and reserve strips shall be prohibited and no public improvements shall be approved for any private street. All streets shall be dedicated for public use.

11. Where a subdivision abuts or contains an existing or planned major thoroughfare of a railroad right-of-way, a street approximately paralleled to and on each side of such thoroughfare and right-of-way may be required for adequate protection of residential properties and separation of through and local traffic. Such service streets shall be located to a distance from the major thoroughfare or railroad right-of-way suitable for the appropriate use of the intervening land, as for park purposes in residential districts, or for commercial and industrial purposes in appropriate districts. Such distances shall also be determined with due regard for the requirements of approach grades and future grade separations.
12. The street arrangement shall not be such as to cause hardship to owners or adjoining property in platting their own land and providing convenient access to it.

13. Cul-de-sac Streets

Cul-de-sac streets, permanently designed as such, shall be discouraged. If allowed by Council action, such cul-de-sac shall not exceed six hundred (600) feet in length, except as variances are permitted. Such a variance may be granted if it can be clearly shown that by reason of unfavorable land form, or the irregular shape of the land from which the subdivision is being made, a normal street pattern cannot be established, or that land would be wasted by not granting such a variance.

Unless future extension is clearly impractical or undesirable, the turnaround right-of-way shall be placed adjacent to a property line and a right-of-way of the same width as the street shall be carried to said property line in such a way as to permit future extension of the street into the adjoining tract. At such time as such a street is extended, the acreage covered by the turnaround outside the boundaries of the extended street shall revert in ownership to the property owner fronting on the temporary turnaround.

14. Street Design

Minimum right-of-way widths and pavement widths (face to face of curb) for each type of public street or road shall be as follows:

<u>Type of Street</u>	<u>Right-of-Way Width</u>	<u>Roadway Width</u>
Thoroughfare (e.g. T.H. 169)	120 feet	As determined by traffic needs
Collector Street (e.g. T.H. 95)	80 feet	44 feet

Commercial/Industrial Service Street	66 feet	32 feet
Minor Street	66 feet	32 feet
Alley	16 feet	16 feet
Cul-de-sac Turnaround	60 feet	45 foot radius

Where a subdivision abuts or contains an existing street of inadequate width, sufficient additional width shall be provided to meet the above standards. Additional right-of-way and roadway widths may be required to promote public safety and convenience when special conditions require it or to provide parking space in areas of intensive use. Extensions of existing street with lesser right-of-way than prescribed above may be permitted by variance in special cases.

15 Street Pavement

The design of street pavement for all streets covered by this regulation shall be in accordance with the most current State of Minnesota Highway Department Road Design Manual for flexible and rigid pavements. The designed thickness of the surfacing elements shall be in accordance with the flexible or rigid pavement design standard for road classifications as follows:

<b><u>Classification</u></b>	<b><u>Pavement Design; Axle Load</u></b>
Thoroughfare, Collector Streets, and Commercial or Industrial Service Streets	As determined by traffic needs per City Engineer
Minor and Service Streets	7 ton minimum (minimum 3" bituminous Wearing course)

16. Curb and Gutter

All new or improved street construction shall incorporate concrete curb and gutter of design B618 as defined by MN DOT Standard Plate Manual.

17. Restriction of Access

Access of minor streets onto State and County State Aid Highways (C.S.A.H.) shall be discouraged at intervals of less than 500 feet.

18. Street Jog

Street jogs with centerline offsets of less than one hundred fifty (150) feet shall not be allowed.

19. Deflection

When connecting street lines deflect from each other at any one point by more than ten (10) degrees, they shall be connected by a curb with a radius of not less than one hundred (100) feet.

20. Grades

Centerline gradients shall be at least 0.5% and shall not exceed the following:

Cross slope gradient minimum 2.0%, maximum 5%.

<u>Classification</u>	<u>Gradient (In Percent)</u>
Thoroughfares and Collector Streets	5
Minor and Service Streets	6
Cul-de-sac Circumference	0.5

21. Vertical Curves

Different connecting street gradients shall be connected with vertical curves. Minimum length, in feet, of these curves shall be twenty (20) times the algebraic difference in the percent of grade of the two adjacent slopes. Maximum slope of approach grades at street intersections of 3.0%. Minimum 30 miles per hour design speed.

22. Angle of Intersection

The angle formed by an intersecting of streets shall be 90 degrees unless otherwise approved by the City engineer.

23. Size of Intersection

Intersections of more than four corners shall be prohibited.

24. Corner Radii for Roadways

Roadways of street intersections shall be rounded by a radius of not less than fifteen (15) feet. Roadways of alley-street intersections shall be rounded by a radius of not less than six (6) feet. Corners at the entrances to the turnaround portions of cul-de-sacs shall be rounded by a radius of not less than twenty (20) feet.

Except in the case of a planned shopping center development, either a public or private alley shall be provided in a block where commercially zoned property abuts a major thoroughfare or major street.

25. Sidewalk Design

a) Sidewalks shall be required in all new subdivisions on at least one side of every street. Sidewalks in all existing subdivisions (prior to 01-01-95) shall be replaced when maintenance warrants it and shall be installed when the requirements of MN Statutes 429 for public improvements have been met.

b) Widths

Minimum sidewalk widths shall, when installed, conform to the following standards:

<u>Classification</u>	<u>Width</u>
Single Family Area	5 feet
Multiple Family Area and Public Building Sites	6 feet
Commercial Areas	10 feet
Industrial Areas	6 feet

c) Grades

Sidewalks shall slope  $\frac{1}{4}$  inch per foot toward the street and the profile grade shall not exceed six percent (6%). The centerline elevation of the sidewalk shall be above the corresponding street centerline.

d) Maintenance

Sidewalk maintenance replacement and/or snow and ice removal shall be the responsibility of the adjacent property owner.

26. Street Names/Numbering

Names of new streets shall not duplicate existing or platted street names unless a new street is a continuation of or in alignment with the existing or platted street. In that event, it shall bear the same name of the existing or platted street so in alignment. Street names shall conform to the City of Princeton's uniform street naming and building numbering system.

27. Block Design

Block length and width or acreage within bounding streets shall be such as to accommodate the size of residential lots required in the area by the zoning code and to provide for convenient access, circulation control, and safety of street traffic.

In residential areas, other than water frontage, blocks shall not be less than three hundred (300) feet nor more than eighteen hundred (1,800) feet in length measured along the greatest dimension of the enclosed block area, unless minor variances are necessitated by topography or conformance with an adjoining plat.

In blocks over nine hundred (900) feet long, a ten (10) foot wide pedestrian crosswalk may be required through the blocks in locations deemed necessary to public health, convenience, and necessity. Suitable paving and fencing shall be provided.

Blocks for commercial and industrial areas may vary from the elements of design contained in this section if the nature of the use requires such variation. In such cases, off-street parking for employees and customers shall be provided along with safe and convenient limited access to the street system. Space for off-street loading shall also be provided with similar access. Extension of roads and utilities shall be provided as necessary.

Blocks shall be wide enough to allow two (2) tiers of lots with a minimum depth as required by the zoning code except adjoining a lake, street, or thoroughfare or where one tier of lots is necessary because of topographic conditions.

28. Lot Requirements

Side lot lines shall be substantially at right angles to straight street lines or radial to curved street lines or radial to lake or stream shores unless topographic conditions necessitate a different arrangement.

Each lot shall be afforded primary access on a public street and shall contain a utility easement around and within the perimeter of each lot no less than eight (8) feet in width.

No lot shall have less area or width than is required by zoning regulations applying to the area in which it is located, except as herein provided.

Lots designed for commercial or industrial purposes shall provide adequate off-the-street service, loading, and parking facilities.

29. Building Sites

Each lot shall provide an adequate building site at least one (1) foot above the street grade or have a site drainage plan which is approved by the City Engineer.

30. Minimum Lot Lines

No lot shall have a total width at the front or rear lot line of less than thirty (30) feet.

Corner lots shall be platted at least twenty (20) wider than interior lots.

31. Butt Lots

In any subdivision butt lots are to be discouraged. Where such lots must be used to fit a particular type of design, they shall be platted at least five (5) feet wider than the average width of interior lots in the block.

32. Through or Double Frontage Lots

Such lots shall be permitted except where such lots abut a thoroughfare or major highway. Such lots shall have an additional depth of ten (10) feet for screen planting along the rear lot line.

33. Water Courses

Lots abutting upon a water course, drainageway, channel, or stream shall have an additional depth or width, as required to assure building sites that are not subject to flooding.

Lots with lakeshore frontage as designed so that the lot lines extended shall maintain the closest approximation to riparian rights.

34. Natural Features

In the subdividing of any land, regard shall be shown for all natural features, such as tree growth, water courses, historic spots, or similar conditions which as preserved will add attractiveness and stability to the proposed development.

35. Lot Remnants

All remnants of lots below minimums size left over after subdividing or a larger tract must be added to adjacent lots, or a plan shown as to future use rather than allowed to remain as unusable parcels.

36. Access to Thoroughfares

In the case where a proposed plat is adjacent to a limited access highway, other major highway, or thoroughfare, there shall be no direct vehicular access from individual lots to such streets and roads. In the platting of small tracts or land fronting on limited access highways or thoroughfares where there is no other alternative, a temporary entrance may be granted. As neighboring land becomes subdivided and more preferable access arrangements become possible, such temporary access permits shall become void.

37. Large Lot Planning and Future Resubdivision

In any area where lots are platted in excess of 24,000 square feet or 160 feet in width at the building setback line, a preliminary resubdivision plan be required showing a potential and feasible way in which the lot or lots may be resubdivided in future years for more intensive use the land. The placement of buildings or structures upon such lots shall allow for potential resubdivision.

38. Monuments

All lot corner pipes or iron rods shall be a minimum of 1/2 inch in diameter, 18 inches in length, and shall be inscribed with the registration number of the land surveyor making the survey as prescribed in Minnesota Statutes, Chapter 505.

39. Street Grading

Streets shall be graded in accordance with a plan approved by the city engineer. The grading shall include the entire width of the right-of-way and shall provide a boulevard section in accordance with the minimum pavement width.

## B. Street Openings (Excavations)

### 1. Permits

A permit will be required for all street openings. A plan, proposed method of work and list of equipment to be used must be furnished before the permit is issued. The permit must be posted on the job site before the street opening is begun.

### 2. Backfilling

- a) In Streets – All trenches shall be backfilled as soon as possible after installation of piping, conduit, or cable. The backfilling consists of placing suitable material in twelve inch (12”) thick layers from a point twelve inches (12”) from the top of the pipe. Pit run gravel shall be used by the contractor for water and sanitary sewer connections when unsuitable material is encountered. Each twelve inch (12”) thick layer shall be compacted before additional backfill is placed in the excavation. The density of the backfilled material after compaction shall be equal to or shall exceed the density of the material before it was excavated. Backfilling shall not be done in freezing weather, except by permission of the Public works Department, and it shall not be made with frozen material. No fill shall be made where the material already in the trench is frozen.
- b) In Boulevards or Open Areas – Backfilling of trenches deeper than three feet (3’) and within five feet (5’) of the curbs shall be done as specified in this Article, Section 1. A modified type of backfilling will be permitted in boulevards or open areas where there is no traffic and settlement is not important. The backfilling may be placed in three foot (3’) thick layers and compacted by wheel type or crawler type equipment, weighing not less than six (6) tons, as the backfill material is deposited in the trench. Excess dirt shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation.

### 3. Restoration of Surface

- a) Street Pavement Width – The street shall be replaced to the original width before construction.
- b) Street Grades – The street surface shall be replaced to the original grade before construction.
- c) Method and Materials – The street construction method and materials shall conform to the Minnesota Highway Department Specifications.

- d) Sidewalk, Curb, and Street Replacement – The contractor shall replace in-kind or better all streets, driveways, curbs, and sidewalks disturbed by his operations. The restoration will be as follows:
- 1) Sidewalks shall be formed and replaced with 4" of concrete placed upon a sand cushion of 2 inch minimum thickness.
  - 2) The curbs shall be formed and replaced with the same type of section and in the same manner of construction as the existing curb.
  - 3) The streets which have a gravel surface shall be replaced with 9 inches of sand and gravel subbase and 6 inches of Class 5 gravel stabilized base.
  - 4) The streets which have a bituminous surface shall be replaced in-kind or as a minimum 6 inches of Class 5 gravel stabilized base, and surfaced with 3 inches of AC hot plant mix wearing surface laid with a paving machine, Minnesota Highway Department Spec. 2331.
  - 5) The contractor shall restore all shrubbery, fences, poles, sod, or other property removed or disturbed to a condition equal to that before the work began.
- e) Allowable Removal of Pavement – The contractor shall use such methods, either cutting or milling, as will assure the breaking of the pavement along straight lines. The face of the remaining pavement shall be approximately vertical.
- f) Subbase and Base Tests – The City reserves the right to require the contractor to have a series of density tests made by an independent testing laboratory, one series for any one trench construction. The City will select the location of the tests.

These tests shall be by the Standard Proctor Density Method in accordance with the American Association of State Highway Officials Method. If the tests fail to meet the requirements of the Standard Proctor Density Test, then the contractor shall do additional compaction over the areas and repeat the density tests. The city engineer shall be furnished with two (2) certified copies of the laboratory reports. Payment for Proctor and Density Tests will be made at the contractor's expense.

The density tests required are as follows:

1. One test taken three feet below the surface, compacted to 95% density.

- 2) One test taken one foot below the finished grade. This is the sub-grade upon which the street is to be constructed and must be compacted to 100% maximum density.
  - 3) One test taken in the Class 5 gravel base, compacted to 100% maximum density.
- g) Protection of Underground Utilities and Protection of All Existing Structures Underground or in the Surface – The contractor’s responsibility shall apply to all property, private or public. The contractor shall restore all facilities interfered with to their original condition or acceptable equivalent. The repairs and replacements shall be made without delay so as to cause a minimum of inconvenience to the property affected. The contractor must check the location of all underground utilities with the proper agencies before excavating.
- h) Provisions for Traffic – The work shall be carried on in such a manner and by such means as to cause a minimum of interference with traffic. Suitable and adequate guards, warnings, barricades, lights, etc. shall be provided for at and around several parts of the work. Temporary bridges and railings shall be provided over the trenches for traffic. Street intersections shall be kept open for traffic. Access to private property shall be maintained.
- i) Barricades, Guards, and Safety Provisions – To protect persons from injury and to avoid property damage, adequate barricades, construction signs, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic to use the street. All material piles, equipment, and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor.

Barricades and guards are to prevent entrance into the working and dangerous area, and to guide traffic away from and around those areas. Lights and signs are to warn of barricades. Proper lights should be visible for 200 feet and windproof. Each end of the project should be marked with signs and lights, and with intervening lights spaced appropriately for visibility and safety. All warning lights shall be electric flashing lights conforming to the requirements set forth below. No open flame torches will be permitted. All barricades used at night shall have not less than one electric flashing light at each barricade and in addition shall be reflectorized with Scotchlite, or equal. The contractor shall notify the Fire Department of barricaded locations.

- j) Cleaning Up – All surplus material, tools, and temporary structures shall be removed from the site by the contractor. All dirt, rubbish, and excess earth from the excavation shall be hauled to a dump and the construction site left clean to the satisfaction of the Public Works Director or his approved representative.
- k) Sodding and Seeding – The contractor shall replace all sod which he/she disturbs or destroys in his/her operations on the easements, ditches, lawns, and boulevards. The contractor shall carry on his operations in such fashion that only the minimum amount of sod is disturbed or removed.

The sod purchased for replacement shall be cultured sod type lawn and boulevard. The sod shall not be cut or laid when the ground is frozen. The sod shall be not less than 1½” thick, shall be cut in strips of not less than 12” in width, not less than 24” in length, and placed within 48 hours after cutting. Sod laid on embankments shall be pegged.

The topsoil shall be replaced with not less than 3” topsoil. This dirt shall be loosened and pulverized by disking or hand raking after the surface has been finished to the former slope and contour.

If, in the opinion of the Public Works Director, the ditch, lawn easement, or boulevard does not contain the quality of growth that would warrant the replacement of the disturbed area with sod, the contractor shall seed the disturbed area. The area shall be seeded after the Public Works Director has approved the finished slopes and contour of the backfill. The seed used shall be labeled in accordance with the Department of Agriculture Rules and Regulations and shall be of quality equal to “Standards for Certified Seeds” of the State of Minnesota.

The grass seed mixture shall be MN/DOT Type 500 seed.

The contractor shall water as necessary the areas which are seeded immediately upon completion of seeding. The contractor shall reseed all areas that do not reestablish a growth of grass equal to or better than that which existed prior to the construction.

- l) Jacking or Auguring Utilities Under Streets – All crossing of the streets made by jacking or auguring shall be made by boring inside a casing or carrier pipe. All voids above the pipe zone shall be immediately filled with cement slurry by adequate pressure grouting equipment methods. No deformation of the street surface will be allowed during the operations.

- m) alternate Method of Backfilling and Street Restoration – Any person obtaining a permit for a street opening may elect to request the City to back-fill an excavated area and any necessary street surfacing restoration; said work will be charged on a time and materials basis.

### C. Sewer Construction

1. Authority of Building Official – The Building Official, under the direction of the Council, shall have control of the municipal drainage and sewer system, and of all drains and sewers now or hereafter built or authorized by the City, and of the building, repair, and maintenance thereof, and connections therewith.
2. Permit Required – No drain shall be built, repaired, extended, or connected with any public sewer or drain until the plan and construction of such drain has been approved by the Building Official and a permit for such building, repair, extension, or connection has been issued.
3. Prerequisites to Issue of Permits – No drain shall be built, repaired, extended, or connected with the public sewer except by a person duly licensed to perform such work, and no permit shall be issued or approved except when granted to such person.

No drain shall be built, repaired, extended, or connected with the public sewer nor a permit issued for any such work until all assessments for sewer construction, or such installments thereof as shall be due at the time such connection is made, shall be paid.

4. Applications and Issuance of Permit – Applications for sewer permits shall be made to the Building Official and the State of Minnesota by the owner/developer. The applicant shall, before beginning work, deposit with the Building Official a plan showing the whole course of the drain, from its connection with the sewer to its terminus within the house, together with the location of all branches, traps, and fixtures connected therewith. The applicant shall submit drawings of the sewer proposed to be constructed. If the proposed sewer, as shown in the drawings, complies with the provisions of the City plumbing code and other provisions of this Code and is satisfactory to the Council, they shall authorize the granting of the permit. The drawing shall be filed as a permanent record in the office of the Building Official.

After the application has been approved, the applicant shall pay to the City of Princeton a fee as described in the Fee Schedule. The City shall grant the permit by affixing the authorized signature on the blank provided for that purpose.

5. Completion and Connection with Public Sewer – The person to whom a permit is granted may proceed with the construction of the sewer in accordance therewith. He/she shall notify the Building Official of the progress of the work at such stages in the course of the construction as the Building Official may direct; and in particular shall notify the Building Official when the construction of the sewer is complete and ready for connection with the public sewer, but before such connection is made.

If the sewer is satisfactory to the Building Official in all respects and complies with all the requirements of the City Plumbing Code and other provisions of this Code, she/he will affix her/his signature to the Sewer Connection Permit and thereafter, but not before, such sewer may be connected with the public sewer. In the case of repair or extension of existing sewers or any work not requiring any tapping of or connection with the public sewer, the work may be completed after the granting of the Sewer Construction Permit without the granting of the Sewer Connection Permit; but the Building Official shall inspect the work after it is completed and before the excavations are filled in, and shall require that the work be done satisfactorily and in compliance with the law before the excavations are filled in.

6. Construction Requirements - The Minnesota Plumbing Code as amended is hereby adopted and incorporated herein by reference. All sanitary sewer construction and materials shall be in accordance with the provisions of said Minnesota Plumbing Code except as follows:
- a) References to bituminized fibre pipe in Section 38 of said Code shall be deleted.
  - b) Section 53 of said Code shall be deleted.
  - c) References to bituminized fibre pipe in Section 125 of said Code shall be deleted.
  - d) References to bituminized fibre pipe in Section 129 of said Code shall be deleted.
  - e) If the distance is further than 75 feet from the sewer main to a house, a four inch (4") clean-out pipe must be installed every 75 feet and brought to the surface of the ground, and must be PVD (SDR 35 minimum) extra-heavy cast iron pipe with a threaded clean-out and must be connected with a wye (Y) and 1/8 bend or combination wye and 1/8 bend facing downstream.
  - f) All sanitary sewer lines from the house to the street must have a minimum depth of six feet (6'), unless insulated to the satisfaction of the Building

Official and except for summer homes which are not occupied during the winter months. Under driveways, all sewer lines must have a minimum depth of six feet (6') unless insulated as stated above.

- g) Only four inch (4") nominal diameter pipe of the following types may be used:
    - 1) Extra-heavy cast iron pipe with leaded or factory fabricated joints.
    - 2) PVD (SDR 35).
  - h) If the surface water table is above the sewer lines, extra-heavy cast iron pipe or PVC (SDR 35) must be used.
  - i) PVD (SDR 40 minimum) extra-heavy cast iron pipe must be used through all septic tanks and cesspools.
  - j) All quarter bends used in the sewer lines must be the longsweep type of bends.
  - k) Neoprene gaskets may be used for joints.
  - l) Plastic pipe acceptable according to the Minnesota Plumbing Code.
7. Only contractors with authorized sewer connection permits, under the direct supervision of the City employee designed for such purpose, may tap into the City sewer line and no one else shall do so unless authorized in writing by the Public Works Director.
8. No plumbing shall be done except under the direct supervision of a master plumber or City licensed contractor when connecting with the public sewer; provided, however, that the building sewer may be constructed (except for connections) by the owner of the building or by such sewer or other licensed contractor under the following conditions:
- a) The owner or licensed contractor shall first obtain a permit as required by this ordinance.
  - b) Before covering or backfilling such building sewer, the owner or contractor must obtain inspection and approval of such building sewer construction by the Plumbing Inspector designated for such purposes.
  - c) In cases where the owner or contractor chooses to construct a building sewer without connecting to either the public sewer or the building drain, such construction shall be permitted if carried out in accordance with this

section and provided that at such time as connection is made to either the building drain or a public sewer, there shall be obtained a second permit and inspection and approval of such additional connection by the Building Official before the connection is covered or backfilled.

- d) In cases where the Building Official has reason to believe that the owner is not competent to do the work contemplated by this ordinance, the owner shall demonstrate his skill, training, knowledge, and experience to the satisfaction of the inspector. In the event the inspector concludes that said owner is not competent, said permit shall stand terminated and revoked until a licensed plumber or contractor is retained.
9. Separate Connections – Every building shall be separately and independently connected with the public sewer.
10. Obstruction Prohibited – No refuse or solids of any sort obstructive to the flow of waste water shall be placed, thrown, or allowed to enter any public sewer, or allowed to remain on or in any trap or catch basin so as to obstruct the sewer; and no person shall injure or break or remove any portion of any catch basin, covering flag, gully grating, flush tank, or manhole, or any part of any sewer, or do any act obstructing or in any way interfering with the use of any sewer or the flow of waste water through any sewer.
11. Steam Exhaust – No steam exhaust or blow off shall be connected with any soil or waste pipe or drain which is connected with a public sewer.
12. Rain Spouts – No rain spout or any other form of surface drainage shall connect with or enter any public sanitary sewer.
13. Inflammable Liquids – No person shall allow any waste from dyeing, clothes cleaning, or other establishments using naphtha, gasoline, or other inflammable liquids to enter any public sewer.
14. Grease – A grease trap and grated slope basin shall be constructed under the sink as part of any drainage system installed in every laundry, hotel, eating place, restaurant, or other public cooking establishment.
15. Slops – All refuse from butcher shops, rendering establishments, and packing houses must be intercepted by some form of catch basin or grated slop basin and not allowed to enter the sewer.
16. Inspection and Repairs – The Building Official or any member of the Board of Health or any representative of either of them shall have the right to enter upon any premises or into any building at all reasonable hours to inspect the sewers, drains, traps, and fixtures connected therewith, If, for any reason, a private

property owner shall refuse to allow the Building Official to enter on his premises for the purpose of making his inspection, said inspector shall not enter upon said premises without first obtaining a warrant permitting him to do so. If it is found that any provision of this Chapter is not being complied with in any respect, or that any part of the drainage system is in need of cleaning out or repairs, the Building Official or any member of the Board of Health or their representative shall serve a notice upon the owner, occupant, and the person in charge of the premises specifying the work to be done to make the sewer system comply with the law or to put it in good workable condition. The notice shall also specify a reasonable time in which to complete such work considering the amount of work to be done and the nature of the emergency. It shall be the duty of every person served with such notice to comply therewith; and if it is not complied with, the City may cause the work to be done at the expense of any person served.

17. Street Excavations – No person shall make any excavation in any street, sidewalk, or public ground without first obtaining a permit from the City. The fee for a permit shall be per the Fee Schedule.

The standard specification for street opening permits in the City of Princeton, Minnesota, shall be complied with in all respects.

If the person doing such excavation work shall fail to remedy any defect found therein within a year after its completion upon notice from the Public Works Director, the City may cause the work to be done at his expense.

18. Excavation Permit – The applicant (i.e. the party performing excavation) for an excavation permit shall, before such permit is issued, file with the City a certificate of liability insurance and workers' compensation insurance, executed by a surety company registered in Minnesota, and a deposit in the sum comparable with current City fee schedule, conditioned on a full performance by the applicant of all the obligations laid upon him by this Code or by his Agreement made at the time of securing the excavation permit.

#### **D. Sanitary Sewer Design Standards**

Sanitary sewer design shall conform to the latest edition of the Great Lakes – Upper Mississippi River Board of State Sanitary Engineers Recommended Standards for Sewage Works.

1. Minimum sanitary sewer laterals 8" PVD (SDR 35) or DIP Class 52.
2. Manholes, 4' diameter precast with aluminum steps at 12" on center, and eccentric cones.

3. Manholes 400' maximum on center.
4. Manhole casting shall be Neenah #R-1733 or approved equal.
5. Sanitary sewer services – minimum 4" PVD (SDR 35) or EXCISP, or one percent (1%) minimum slope.
6. Wyes are to be used on new construction and wherever possible on connections to existing sewers.
7. Separate sewer services are to be extended to each structure and/or service account.
8. Direct connection of services to manholes is prohibited, unless authorized by the city engineer.
9. All sewers and services within public right-of-way shall be a minimum of 10 feet deep below roadway centerline, unless insulated and approved by the city engineer.
10. Services longer than 75 feet shall have 4" clean-out risers brought to the surface of the ground. Clean-outs must be PVD (SDR 35) pipe with threaded clean-out and must also be connected with a wye and 1/8 bend or combination wye and 1/8 bend facing downstream.

**E. Storm Sewer Design Standards**

1. Design frequency storm of five years for residential.
2. Design frequency storm of ten years for commercial and industrial.
3. Minimum design velocity of 3 feet per second.
4. Minimum storm sewer pipe size of 12 inches.
5. Minimum culvert size 15 inches.
6. Aprons for all roadway culverts in like materials to culvert.
7. Flared end section for all storm sewer outlets and inlets.
8. Design frequency of 100 years for all retention basins or street low points.
9. Minimum retention basin free board of 1 foot.

10. Maximum basin side slope of 5:1.
11. Minimum retention basin depth (desirable) of 4 feet.
12. Precast manholes and catch basins shall meet requirements of ASTM C-478.
13. Pipe shall be reinforced concrete of class as shown on plans and ASTM C-361.
14. Corrugated metal culvert shall be 16 gauge galvanized complying to ASTM A-444.
15. Manhole casting shall be Neenah #R-1733 or equal.
16. Catch basin castings shall be Neenah #403-A or equal.
17. Catch basins shall be installed so that overland drainage does not exceed 600', unless otherwise approved by the city engineer.
18. Storm sewer shall be extended to eliminate need for cross gutters.
19. Drainage swales shall have maximum cross slope of 4:1.
20. Drainage swales shall have minimum longitudinal grade of 1.0 percent.

#### **F. Watermain Design Standards**

An application to the Princeton Public Utilities Commission for water service shall be made prior to start of construction.

**NOTE:** A street excavation permit and bond will be required.

1. Minimum size of watermain is 6 inches. All pipe shall be Class 52 ductile iron pipe.
2. No dead end mains greater than 600 feet in length.
3. The dead end of a main shall be equipped with a fire hydrant for flushing purposes.
4. Hydrants shall be spaced so that all portions of a building or residence to be protected fall within a 250 foot radius of a hydrant.

5. Hydrants shall be Waterous "Pacer" with two 2½" hose connections and one 4½" steamer connection with national standard threads. Hydrants shall meet the requirements of AWWA Standard C502. Hydrants shall open left and shall be provided with drain to operate only when hydrant is closed.
6. Each hydrant lead shall be equipped with a gate valve and box for shut-off purposes. Gate valve shall be resilient-seated gate valves meeting requirements of AWWA Standard C509 design for 200 psi working pressure. The gate valve shall have mechanical joint ends, a non-rising operating stem with "O" ring seals, a 2" operating nut and shall open left.
7. Valves shall be placed throughout the distribution system so that each portion may be isolated with the least interruption of service. Generally, place valves at each roadway intersection or intersection of water mains.
8. Minimum depth of cover over watermains shall be 7.5 feet.
9. Minimum size of house service is ¾".
10. Corporators shall be ¾" diameter equal to Mueller H-15000 with Mueller thread inlet and copper service pipe outlet.
11. Curb stops and boxes shall be ¾" diameter equal to Mueller H-15154 Mark II Oriseal with Mueller Minneapolis pattern curb boxes with stationary rods for ¾" through 2" sizes.
12. Water service lines 1½" and smaller shall be copper type K soft specifications of ASTM B88.
13. Fittings shall be ductile iron with pressure rating 350 psi with mechanical joints and conforming to ANSI A21.53, ANSI A21.4, and ANSI A21.11.
14. Each watermain joint, whether "push-on" or mechanical joint type, shall be electrically bonded with an external copper jumper capable of carrying 500 amps for an extended period.
15. The design shall be in accordance with the Minnesota Department of Environmental Health, the Ten State Standards.

#### **G. Street and Utility Service Life**

Public improvements are judged to have normal useful life expectancy. For the purpose of this policy, this life expectancy shall be as follows:

1. Surface improvements

Concrete curb and gutter	30 years
Bituminous roadways	30 years
Sidewalks	50 years

2. Subsurface improvements

Watermain	50 years
Sanitary Sewer	50 years
Storm Sewer	60 years

3. when any existing improvement is ordered to be renewed or replaced, the assessments to be levied will be prorated from 0% at one-half life expectancy to 100% at full life expectancy or beyond.

**H. Easements**

The location of all easements shall be coordinated with the appropriate agencies servicing the area. Drainage easements shall be coordinated with the City of Princeton. The minimum width of all easements shall be 16’.

**I. Electrical Standards**

An application to the Princeton Public Utilities Commission for electrical service should be made prior to start of construction.

**NOTE:** An excavation permit will be required.

There will be an “Amp Charge” to customers for overhead line extensions, as well as upgrades to permanent services and dwellings within the Public Utilities Commission’s service area.

The following “Amp Charge”\* shall apply:

- |                          |                  |
|--------------------------|------------------|
| 1) Multiple Residence    | See Fee Schedule |
| 2) Single Residence      | See Fee Schedule |
| 3) Commercial/Industrial | See Fee Schedule |

\*Subject to annual adjustment.

Underground service extensions, by request of the customer, will be made with the same “Amp Charge.” The Public Utilities Commission will trench in the wire unless it is unaccessible, in which case the customer has to provide a 24” deep trench for the wire to be buried. In either case, after the initial connection of the underground

line extension, the maintenance of this service becomes the responsibility of the customer.

When a customer requesting a line extension is not within the city limits, the Public Utilities Commission will extend its services within its authorized service area (in accordance with the requirements for overhead and underground extension) only when anticipated revenue from the sale of the additional service which will result from the extension is sufficient to be justified. The extension will be made only if the customer pays to the Public Utilities Commission the portion of the capital expenditure not justified by the anticipated annual revenue.

All installations shall be in accordance with the National Electrical Code and subject to final approval by the State Electrical Inspector prior to activation of service.