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19.24.010 GENERAL

Any development approved under the Village of Mundelein Subdivision Ordinance and any development intending to construct improvements which are addressed herein, shall comply with the required improvements stated in these Engineering Design Policies.

Subdividers and/or developers shall construct all public improvements to specifications and cause the completed improvements to be dedicated to the Village or appropriate agency or unit of government. All private improvements shall be completed as required and approved by the Village. Private improvements shall be constructed to the same standards as public improvements.

19.24.020 SOIL EROSION AND SEDIMENTATION CONTROL

All soil erosion and sediment control facilities shall be designed, installed and maintained in accordance with the watershed development ordinance requirements. All erosion control measures shall be outlined in the watershed development permit application, which must be submitted as part of any development plan.

19.24.030 RESTORATION OF DISTURBED AREAS

Saw Cutting: When necessary to remove sections of existing pavement, sidewalk, or curb and gutter, and prior to removal, the edges of the section to be removed shall be cleanly cut with a concrete saw.

Concrete Pavement: Where the existing roadway pavement surface is Portland Cement Concrete, the pavement replacement shall be Portland Cement Concrete pavement at a minimum thickness of six-inch (6") or existing pavement depth, whichever is greater. Portland Cement Concrete and construction methods for Portland Cement Concrete pavement shall conform to the current requirements of the "Standard Specifications for Road and Bridge Construction" of the Illinois Department of Transportation, for Portland Cement Concrete pavement. Pavement joints and reinforcements in the replacement pavement shall conform to and match those in the adjacent pavement area.

Bituminous Concrete Pavement: Where the existing pavement surface is bituminous concrete and the base consists of a rigid material such as brick or Portland Cement Concrete, the base replacement shall consist of eight inch (8") Portland Cement Concrete base course. The surface replacement shall consist of a bituminous prime coat, a binder course, and a surface course conforming to the requirements of the Mundelein Construction Design Details and the "Standard Specifications for Road and Bridge Construction" of the Illinois Department of Transportation for Bituminous Concrete Binder and Surface Course, Class I.

Concrete Sidewalks, Driveways, Curb, and Curb and Gutter: Where necessary to remove and replace concrete sidewalk, driveways, curb, and curb and gutter, replacements shall be made according to the Mundelein Engineering Details regulating the construction of driveways, approaches, and sidewalks. Curb or curb and gutter dimensions and cross-sections shall conform, as nearly as practical, with the existing installations. At intersections with sidewalk that does not conform to State of Illinois ADA Requirements, sufficient depressed curb and gutter along with sidewalk shall be replaced to meet said

ADA Specifications. One-half inch (½") preformed expansion joints shall be placed at intervals not exceeding fifty feet (50') and at the junction with existing work. Saw cut crack control contraction joints shall be made every twenty feet (20') (minimum) and shall be a minimum of one-half inch (½") in depth. Sidewalks shall be finished to match existing adjacent sidewalk surfaces. Replacement of sidewalk at street curbs shall meet all current State and/or Federal Requirements for accessibility. Curing compound shall be applied to all concrete surfaces in accordance with the IDOT "Standard Specifications for Road and Bridge Construction." Calcium chloride or other accelerants are not permitted. The developer is responsible for the monitoring of the sidewalk, curb, driveway, or pavement until it is cured. Damage to pavement for any reason will require replacement. All traffic, pedestrian, and safety requirements are the responsibility of the developer.

Grassed Areas: Provide topsoil, seeding, sod, and care of grass during establishment period for a complete surface restoration of lawns, parkways, and other areas disturbed as a result of the construction.

Topsoil

Topsoil shall be furnished and properly placed, raked, and rolled to a minimum depth of four inches (4"). The topsoil furnished shall consist of loose, friable, loamy, non-acid soil, having at least ninety percent (90%) passing a Number Ten (No.10) sieve, free of large roots, brush, sticks, weeds, stones larger than one quarter inch (¼") in diameter, and any other debris. Before topsoil is placed, the area to be covered shall be brought to the proper grade. If the existing surface has become hardened or crusted, it shall be raked or otherwise loosened to provide a suitable bond with the topsoil. Apply commercial grade fertilizer uniformly at a rate of twenty (20) pounds per one thousand square feet (1,000 ft²). Work fertilizer into soil prior to seeding or installing sod.

Sod

Sod is required in all parkways.

Provide sod in developed areas that were grassed prior to construction, all unpaved areas within public right-of-way and as indicated on the drawings. Sod shall also be used in ditches and drainage swales and on all embankment slopes steeper than four to one (4:1) unless protection is provided against erosion of seeding. At the developer's option, sod may be substituted for seeding.

The cut sod shall be not less than two inches (2") thick. Sod, which has been cut more than forty-eight (48) hours prior to installation, shall not be used without the approval of the Village Engineer.

Sod shall be placed according to IDOT Standard Specifications. Place sod with edges in close contact and alternate courses staggered. On slopes two to one (2:1) or steeper, sod shall be staked with at least one (1) stake for each piece of sod. Do not place sod when the ground surface is frozen or when air temperatures may exceed ninety degrees Fahrenheit (90°F).

New sod shall be watered daily at the rate specified in the IDOT Specifications for a minimum of seven (7) days after the specified initial watering. Village water used shall be approved by the Village prior to usage and shall be metered and paid for by the developer. Any tankers used must be filled at the

direction of the Director of Public Works. Any defective, dead, or dying sod shall be removed and replaced up to one (1) year after completion of the sod.

Seed

In ditches, the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the longer dimension parallel to the contours of the ground.

Seed all grassed areas disturbed by construction operations and not receiving sod in accordance with the IDOT Standard Specifications. Seed shall be placed between September 1st and November 1st, or in spring from the time the ground can be worked until May 15th. Do not seed in windy weather or when soil is very wet. Place seed either mechanically or by broadcasting in two (2) directions at right angles to each other to achieve an even distribution.

Immediately after seeding, apply vegetative mulch unless hydraulic seeding method is used. Apply mulch in accordance with the IDOT Standard Specifications. Place erosion control excelsior blanket or fiber mat on slopes steeper than three (3) horizontal to one (1) vertical. Unless otherwise indicated, also place erosion control material at sides and bottoms of ditches, swales, and all areas within ten feet (10') of catch basins in seeded areas.

Immediately after placing erosion control matting or mulch, water seeded areas thoroughly. Keep soil thoroughly moist until seeds have sprouted and achieved a growth of one inch (1").

19.24.040 SANITARY SEWER SYSTEM

Sanitary sewer systems shall be designed and installed in accordance with the provisions of Title 35, Subtitle C, Chapter II, Part 370, "Illinois Recommended Standards for Sewage Works," latest edition; Standard Specifications for Water and Sewer Main Illinois Construction Administrative Code, in Illinois, latest edition; Mundelein Construction Design Details, these Mundelein Engineering Design Policies, and applicable Village Ordinances.

19.24.050 STORMWATER MANAGEMENT AND STORM SEWER SYSTEMS

The design of stormwater management facilities shall comply with the Watershed Development Ordinance.

Grading shall be completed such that overland water flow is directed away from all sides of building foundations. Unless otherwise approved by the Village Engineer, all grades on lot shall be a minimum of two percent (2%) and a maximum of fifteen percent (15%). Steeper slopes may be approved conditioned upon the appropriate use of sod, retaining walls, or other special treatments to protect the slopes.

In no case shall side slopes of detention facilities be steeper than six to one (6:1).

Detention in parking lots is prohibited. In the event of a complete failure of detention facilities, the parking lot must be designed such that maximum inundation depth in parking lots shall not exceed six-inches (6").

Storm Sewer

In areas where curb and gutter and storm sewers are approved, inlets shall be installed so that the distance between each inlet shall not exceed four hundred feet (400') and each inlet shall drain a maximum street gutter length of four hundred feet (400'). Where the inlet is located at a low point, the Village Engineer may require additional inlets. Inlets shall be so located that stormwater runoff will not "pond" greater than half of the traveled lane width. Depressed street crowns to facilitate drainage will not be permitted. Storm sewer design shall follow the inlet to catch basin to manhole configuration.

One hundred (100)-year flow depth in the streets shall not exceed the curb height and the streets shall be generally passable to motorists by maintaining a twelve foot (12') dry through lane centered along the roadway centerline at all times.

Public storm sewer on private property may only be placed along side yards perpendicular to the right-of-way. Yard inlets shall be no further than four hundred feet (400') from any storm sewer main located in the right-of-way. Yard inlets and associated sewers shall have no deflection in the piping and connect to either a catch basin or manhole located in the right-of-way.

The minimum size storm sewer shall be twelve inches (12") in diameter.

Unless otherwise approved by the Village Engineer, storm sewers shall be reinforced concrete pipe conforming to ASTM C76 minimum Class III with O-ring joints conforming to ASTM C443. All inlet connections shall be concrete sewer pipe, ASTM C14 for extra strength pipe.

All manholes, inlet manholes, inlets and catch basins, and headwalls shall be designed in accordance with the Mundelein Construction Design Details.

Culverts

Only reinforced concrete pipe (RCP) shall be used and conform to ASTM C76, minimum Class III. Corrugated Metal Pipe, as approved by the Village of Mundelein, may be used for replacement of existing culverts.

Minimum pipe diameter is twelve inches (12").

Fifty (50)-year design frequency (the fifty (50)-year storm will be conveyed with less than one tenth of a foot (0.1') increase in head from the natural (no culvert) condition.)

19.24.060 SANITARY AND STORM SEWER TELEVISED INSPECTION

All public storm sewers and sanitary sewers shall be internally inspected by televising with a closed circuit television system prior to subdivision acceptance or certificate of occupancy as applicable.

Provide a closed circuit television (CCTV) and audio-video recording system for internal inspection of mainline sewer capable of producing picture quality to Mundelein's satisfaction.

19.24.070 WATER DISTRIBUTION SYSTEM

Potable water facility design shall be in accordance with the Village of Mundelein Ordinance and the rules and regulations of the Illinois Administrative Code, Title 35, Subtitle F, Chapter II, Part 653, "Design, Operation and Maintenance Criteria," latest edition; and the Recommended Standards for Water Works, latest edition (commonly known as the Ten State Standards). All water system improvements shall meet the requirements of the latest editions of the Standard Specifications for Water and Sewer Main Construction in Illinois, the American Water Works Association (AWWA), as well as specific requirements of the Village.

Water main sizes shall be designed to adequately service the subdivision, including fire flow. All systems must be sized to provide for future expansion and may need to be oversized to provide sufficient regional flow. All mainline water mains shall have a minimum inside diameter of eight inches (8").

All water mains shall be located in the parkway, opposite that of the natural gas mains, in accordance with Engineering Construction Details.

The minimum service size shall be one-inch (1") diameter for single-family residences and shall be sized accordingly for all other areas. Fixture calculations in accordance with the Illinois Plumbing Code, latest edition, shall be submitted for review and approval.

Fire service mains shall be no less than six-inches (6") in diameter or the diameter of the smallest riser, whichever is greater. Fire service mains also shall be "looped," having two (2) points of connection to the water distribution main when a single feed fire service main will exceed three hundred feet (300') in length.

Fire service mains and services require approval of plans by the Village of Mundelein Fire Department.

Mains shall be sized to provide sufficient capacity to deliver the minimum required fire flow to all areas served by the proposed construction with consumption at the maximum daily rate as summarized below.

Development Type	Minimum Required Fire Flow (GPM)
Single-family, detached, and two-family dwellings (with approved fire wall) not exceeding two stories in height <i>AND</i> distance between buildings > 31 feet	1,000 GPM for minimum 2 hour duration
Single-family and two-family dwellings (with approved fire wall) exceeding two stories in height <i>OR</i> distance between buildings < 31 feet and >10 feet	1,500 GPM for minimum 2 hour duration
Single-family and two-family dwelling units (with approved fire wall) with distance between buildings <10feet	2,500 GPM for minimum 2 hour duration
Multiple-family residential building	2,500 GPM for minimum 2 hour duration

Development Type	Minimum Required Fire Flow (GPM)
Office/Warehouse	2,500 GPM for minimum 2 hour duration
Commercial/Business (general)	3,000 GPM for minimum 3 hour duration
General Manufacturing	3,000 GPM for minimum 3 hour duration
<i>High-Risk</i> Manufacturing	3,500 GPM for minimum 3 hour duration
Institutional	3,500 GPM for minimum 3 hour duration
Notes:	
The fire flow rates must be available while maintaining a minimum of twenty pounds per square inch (20 psi) residual pressure throughout the existing distribution system and extension that serve the proposed service area.	
The table illustrates only minimum required fire flows. The Village may require higher fire flows for longer durations based upon the size of the building and type of construction, requirements or which shall generally be in accordance with Appendix III-A of the Uniform Fire Code, 1997 published by International Fire Code Institute. A copy of Appendix III-A is included at the end of this section.	
A reduction in the required fire flow (not to exceed fifty percent (50%) of the above established minimum required fire flow) as approved by the Village Engineer and in coordination with the Fire Department, may be allowed when the building is provided with an approved automatic fire sprinkler system.	

Maximum Day Consumption

Maximum day consumption in residential areas shall be based on a minimum of three hundred (300) gallons per person per day. Alternately, the maximum day consumption may be based on the following values of flow rate per dwelling unit:

- One thousand fifty gallons (1,050gal), per unit, per day for single-family and two (2)-family residences;
- Nine hundred gallons (900 gal), per unit, per day for townhome building; and
- Seven hundred fifty gallons (750gal), per unit, per day for apartment building.

Maximum day consumption in non-residential areas shall be based on a calculation of expected maximum day water demand for each building in the area. For each building, a description of the building use, occupancy, and unit consumption value shall be included with the calculation. Unless the descriptions and calculations for each building in the area justify a lower value or when the details of the development are not known, the amount of maximum day consumption for non-residential areas shall be at least equal to fifteen hundred gallons per day (1,500gpd) for each acre included in the total area devoted to non-residential categories of land use, plus process water requirements. In all cases, the maximum day consumption value shall be approved by the Village Engineer.

Storage Requirements

The total required storage is primarily based on the distribution network system firm supply capacity; the required operating storage volume; and the fire reserve volume.

Firm Supply

The Village utilizes Central Lake County Joint Action Water Agency (CLC JAWA) water from Lake Michigan. Water is supplied at three (3) connection points within the Village's water distribution network and stored in four (4) ground reservoirs. The water from the ground reservoirs is distributed into the system by three (3) pumping stations (Campus Drive, Maple Avenue, and Winchester Road). The Village's firm supply is equivalent to the ability of the three (3) pumping stations to supply the maximum day consumption demand with the largest reservoir or pumping station out of service. The Village will reevaluate the existing firm supply based on the additional maximum day consumption demand of any proposed development. The Developer shall design and construct any new facilities or modifications necessary to bring the Village's firm supply into compliance with the system's maximum day consumption. In the event the firm supply is not available, the difference in the maximum day consumption demand and supply shall be provided in storage.

Operating Storage Volume:

The required operating volume for the purposes of this section is defined as the volume in storage that is used on a daily basis during peak hour conditions. The peak hour rate of usage is generally utilized as twice (2x) the maximum day rate of usage. The peak hour condition is expected to occur for a total of four (4) hours on any given day. Therefore, for a single family residence:

Maximum Daily Usage:

- One thousand fifty gallons per day (1,050gpd) [Three and one half (3.5) person multiplied by three hundred (300) gallons per person per day (3.5 x 300 gal/per/day)]

Maximum Daily Rate of Usage:

- [One thousand fifty gallons per day (1,050gpd)] [twenty-four hours per day (24hrs/day)] = Forty-three and three quarters gallons per hour (43.75gph).

Peak Hourly Rate of Usage:

- Two multiplied by forty-three and three quarters gallons per hour (2 x 43.75gph) equals eighty-seven and one half gallons per hour (87.5 gph). Since the maximum day rate of usage is available via firm supply, the operating volume = (peak hour rate of usage – maximum day rate of usage) x four (4) hours. Therefore, the required operating volume for single family residence = eighty-seven and one half minus forty-three and three quarters gallons per hour (87.5gph - 43.75gph) x four (4) hours = one hundred seventy-five gallons (175gal). In other terms this can also be calculated by taking the maximum day consumption calculated above divided by six (6). Utilizing the above, the required operating volume associated with new demands shall not be less than an amount equal to the sum of the following:

- For single-family residences, one hundred seventy-five gallons (175gal) for each dwelling unit;
- For townhome residential building, one hundred fifty gallons (150gal) for each dwelling unit;
- For apartment residential building, one hundred twenty-five gallons (125gal) for each dwelling unit; and
- For non-residential units, an amount equal to the maximum day water consumption in gallons determined above divided by six (6).

- The increase in the required operating storage volume resulting from the new demands from new developments shall be the financial responsibility of the developer and is available from any combination of the following: (1) a new storage tank in the vicinity of the service area and operating zone, (2) existing storage tank(s) with excess capacity, and/or (3) planned storage tank(s) with excess capacity. The available volume from each contributing storage tank shall be a reserve volume only allocated for operating storage. The availability of this reserve operating volume shall be verified by the Village Engineer using a computer model of the Village's existing water system. The model shall be modified to include the new demands, the water system extension to provide service to the area of new demands, and any planned water system facilities not yet constructed.

Fire Reserve Volume:

The largest fire flow volume indicated in any one of the categories of the development provided in Section 19.3.03 A, and included in the new water service area, shall be the financial responsibility of the developer and is available from any combination of the following: (1) a new storage tank in the vicinity of the service area and operating zone, (2) existing storage tank(s) with excess capacity, and/or (3) planned storage tank(s) with excess capacity. The available volume from each contributing storage tank shall be a reserve volume only allocated for fire protection. The availability of this reserve volume shall be verified by the Village Engineer using a computer model of the Village's existing water system. The model shall be modified to include the new demands, the water system extension to provide service to the area of new demands, and any planned water system facilities not yet constructed. Sufficient storage shall be provided by the developer to equal the sum of the deficient firm supply, required operating and fire reserve volumes described above and as approved by the Village Engineer. Existing storage tank(s) with excess capacity, and/or planned storage tank(s) with excess capacity may be used to offset all or part of the total required storage volume as verified and approved by the Village Engineer and as subject to the payment of recapture amounts determined by the Village.

Fire Hydrants

Fire hydrants shall be installed along all mains constructed in public rights-of-way at a maximum spacing of three hundred feet (350') with the most remote part of any building no farther than three hundred feet (350') from a hydrant.

- Fire hydrants are required to be located a minimum of three feet (3') clear distance from the closest point to any paved vehicular roadway traffic surface and a minimum of two feet (2') from any paved pedestrian traffic surface.
- Fire hydrants shall be no closer than eight feet (8') from any street light installations.
- Hydrants shall be installed no closer than three feet (3') to the back of curb from the steamer port (pumper nozzle), nor further than eight feet (8') from the back curb. No hydrant shall be installed within forty-eight inches (48") of any obstruction, nor shall any obstruction be placed within forty-eight inches (48") of an existing hydrant.
- Fire hydrants shall be located on lot lines. (Single family residential.)
- Fire hydrants must be located at least twenty feet (20') from any intersection.

- Distance between hydrants on building sites shall not exceed three hundred fifty feet (350'), and the maximum distance from a hydrant to a fire department connection shall not exceed one hundred fifty feet (150').
- The developer will be responsible for supplying the Village of Mundelein Public Works, one hydrant flag for each hydrant installed in the Village of Mundelein. Each flag will be "spring type", four feet by three eighths of an inch (4' x 3/8") and applicable to a two and one half inch (2.5") hydrant port.
- All hydrants shall be "Safety Red".

Valves

Water main valves shall be spaced at a minimum of four hundred feet (400') or at a distance such that in the event of a required shut down of the public main, no more than twenty-four (24) units shall be out of water service, whichever results in the shortest valve spacing. Vaults and auxiliary and b-boxes shall not be allowed under driveways or sidewalks.

Connection to Existing Mains

All connections to the Village water distribution system shall be made under full water service pressure in accordance with Mundelein Construction Details.

Water Service Lines

A water service line is designed to deliver water from a public water distribution main and extended from the main to a single building, and includes corporation stop, curb stop, and service box. Service lines shall be type K copper and installed approximately at a right angle to the centerline of the right-of-way. Service lines shall be continuous with no splices between either the corporation and the curb stop or the curb stop and the house meter.

Private irrigation systems are not permitted within easements or in the Village right-of-way.

19.24.080 ROADWAYS AND SIDEWALKS

General

Improvements to adjacent roadways shall be made in accordance with an approved Traffic Impact Study or at the direction of the Village Engineer.

The Village Engineer shall determine street classification for any new subdivision. The roadway geometry required for each classification of street shall be designed in accordance with all Mundelein Construction Details.

Combination concrete curb and gutter shall be constructed along the edge of all pavements except as otherwise approved by the Village Engineer. Cross-section, details, materials, and construction shall conform to the requirements of the "Standard Specifications for Road and Bridge Construction" of the Illinois Department of Transportation for Combination Concrete Curb and Gutter for Barrier Curb, Type B6.12 and Mundelein Construction Details unless otherwise approved by the Village Engineer.

The curb and gutter shall be stamped on the face of the curb with a "W" indicating the location of a water service, and a "S" indicating the location of a sanitary sewer service and "ST" for storm sewer (sump pump) service.

Driveways meeting the requirements of this subchapter and as shown in the Mundelein Construction Details, shall be provided at all locations where vehicular traffic is intended to exit and enter the roadway. The requirements of this subchapter shall also apply to driveways to be constructed in developed areas with existing roadways. The limits of driveway approaches to be constructed in compliance with this section and as shown in the Mundelein Construction Details shall be between the roadway itself (back of curb) and the roadway side of the sidewalk.

Bituminous Pavement

Bituminous pavement structure for roadways and driveways shall conform to Mundelein Construction Details.

No construction required by this subchapter shall be permitted after November 1st without written authorization from the Village Engineer.

In new construction, surface course shall be placed no earlier than twelve months from the placement of the binder course, unless otherwise approved by the Village Engineer in writing.

Concrete Pavement

Concrete pavement structure for commercial/industrial driveways shall conform to Mundelein Construction Details.

All roadway medians shall have tapered approaches at both ends of the median so as not to create an obstruction to snowplowing operations. The tapers shall be constructed in accordance with the IDOT Standard for PC Concrete Islands and Medians.

No calcium chloride or other chemical additive to accelerate the curing process shall be added to the mix that is being applied to public property or public improvements.

Sidewalks

Excavation: If, in the opinion of the Village Engineer, organic material is present at the proposed subgrade, the organic material shall be removed to a minimum of five inches (5") below the subgrade or in accordance with geotechnical representative directions and replaced with compacted CA-6 compacted crushed stone or recommended remedial treatment.

Embankment: When necessary to construct sidewalk on fill, fill shall be placed in six inch (6") lifts and thoroughly compacted. Embankment shall extend one foot (1') beyond edge of walk. Side slopes shall not be steeper than four to one (4:1), except as approved by the Village Engineer.

Subgrade Preparation: Following sub-grade preparation and no sooner than twenty-four (24) hours prior to placing concrete, the developer shall notify the Village Engineer that forms are in place and the subgrade is ready for inspection. Subgrade compaction tests may be required where deemed appropriate by the Village Engineer. Concrete shall not be placed until the subgrade has been inspected and approved.

Manholes, inlets, valve vaults, b-boxes, or other types of structures shall not be constructed in a sidewalk.

Expansion Joints/Control Joints: Preformed bituminous joint filler, one half inch ($\frac{1}{2}$ ") thick, shall be placed every fifty feet (50') minimum and one half inch ($\frac{1}{2}$ ") thick between the sidewalk and all structures such as Light Standards, Traffic Light Standards, and traffic poles which extend through the sidewalk. Control joints, one quarter of ($\frac{1}{4}$) the depth of the sidewalk, shall be on five foot (5') centers.

Protection and Curing: All exposed surfaces of concrete shall be protected against damage from precipitation. The concrete shall be cured for a minimum period of three (3) days after placing using a membrane curing compound. Damage to right-of-way improvements caused by the Village of Mundelein ice control and snow removal activities shall be repaired by and, is the responsibility of the developer until the subdivision has been accepted and the warranty period has expired.

Ramps: Sidewalk ramps must extend in each direction at intersections. Ramps shall be ADA approved ramps in accordance with IDOT Standards. Terra Cotta red pavement must be colored concrete. Painting of concrete is not permitted.

Median Islands

Function and Purpose: In its most basic form and function the median is a raised surface within the roadway delineating between two opposing directions of travel, typically designed by integrating

landscape. Medians are important roadway features for aesthetic, environmental, and mobility purposes. Specifically, medians can accomplish several goals such as beautifying the street with attractive landscaping; establishing a sense of and/or serve as a gateway to a community; absorbing stormwater and decreasing the burden on existing storm drainage; improving air quality; providing a mid-block refuge for pedestrians crossing streets; and calming traffic speeds by simulating a narrower street.

Design and Maintenance Guidelines: Medians are located throughout the Village, constructed as required street improvements for development. The Village of Mundelein Public Works and Engineering Department is responsible for maintenance of medians within public right-of-way. Median standards are addressed in the Engineering Construction Standard Details and Notes, which can be accessed by clicking [here](#). The goal for the design and maintenance guidelines contained herein is not to replace those standards, but to serve as an easy-to-reference, supplementary guide that illustrates median design options and maintenance practices. The guideline is a component of design and/or maintenance that needs to be addressed by the private developer when improving current medians or constructing new medians within the Village.

Application: Landscape medians shall be designed at the time any new subdivision is proposed where new public right-of-way for roadway purposes is created within the Village of Mundelein and shall be installed at the time of development of the proposed subdivision. Subdivisions creating new roadways shall install a landscape median at each access point into the newly created development. The landscape median shall be constructed with a vegetative island that includes irrigation and electric service to allow for maintenance of the median. The cost for such installation shall be the responsibility of the developer. The Village shall take maintenance responsibility upon final acceptance of the right-of-way and bill of sale to transfer ownership.

Design Guidelines

Dimensional Feature	Guideline
Length	30-foot minimum
Width ¹	8-foot minimum
Width ¹ (for bio-swales)	See Watershed Development Ordinance and consult Public Works & Engineering Department at (847) 949-3220.
Curb height	Consistent with curbs in subdivision, meeting Village Code
Median ends	Flared to allow for transitioning traffic

¹Median width is measured from inside edge of curb to inside edge of curb.

Landscape: Each median shall include native trees, shrubs or vegetative cover that does not impede line of sight or create hazardous traffic conditions. The Village’s list of approved parkway trees shall be utilized for the installation of any trees within the median. The medians can also be utilized to implement stormwater management best management practice (BMP) measures in conformance with the Lake County Watershed Development Ordinance as appropriate. Plant types can be a combination of trees, shrubs, grasses and ground cover. All plantings shall be native, non-invasive varieties. Turf grass is not allowed as part of the design for the median islands.

Exceptions: The Village shall consider exceptions for subdivisions that can be classified as follows:

- No new right-of-way or public roadway created as part of subdivision;
- Cul-de-sac only subdivision development;
- Overall size of development makes;
- Limited right-of-way width due to factors that cannot be mitigated; or
- The location is a downtown secondary road.

In any of these conditions, the Village may grant an exception to landscape median requirement for the development.

19.24.090 TRAFFIC IMPACT STUDIES

Introduction: This shall include a brief description of the size of the development, the location, the political jurisdiction in which the development is located (including an area location map), the roadways in the site vicinity, the boundary of the study area, and any other general information that would assist in the review of the development's traffic impact.

Existing and proposed land-uses of the development shall be described. If several alternative land-uses are being proposed, the land-use that generates the most trips will govern.

Road Network Area: Traffic volumes (average daily traffic volumes and weekday A.M./P.M. peak hour), road geometrics, intersection geometrics, and traffic control devices shall be shown or described in the site vicinity. The influence area shall be determined by the traffic generated from the site, the trip distribution of the traffic, and the trip assignment of the traffic generated by the development over the surrounding area road network.

Given the unique characteristics of commercial/retail developments and other certain land use types, the Village Engineer may require average daily traffic volumes (24 hour traffic counts) and AM/PM peak hour traffic counts for Saturday traffic.

Peak-Hour Trip Generation Rates and Volumes: A summary table shall be prepared listing each type of proposed land-use, the size or area for each type of land-use, the average trip generation rates (both average daily traffic volumes and weekday A.M./P.M. peak hour of the adjacent street traffic) for each type of land-use, and total number of trips generated. The trip generation rates, both average daily traffic volumes and A.M./P.M. peaks, shall be calculated from the latest data available contained in the Institute of Transportation Engineers' ITE Trip Generation Manual.

Trip Distribution: Both a figure and table shall be presented to show the directional distribution of site-generated traffic approaching and departing the site on the area road network. An explanation of the rationale behind the trip distribution shall also be included.

Trip Assignment: The technical analysis, methods, and assumptions used in the assignment shall be clearly stated. The trip distribution and subsequent assignment shall represent the most logically traveled routes.

Existing and Projected Traffic Volumes: The following traffic volumes for access facilities, intersections, and the area road network within the area of influence shall be provided in a graphic map format.

- A.M. weekday peak-hour of adjacent street traffic for the site generated traffic volumes.
- P.M. weekday peak-hour of adjacent street traffic for the site-generated traffic volumes.
- A.M. weekday peak-hour existing traffic volumes within the site vicinity.
- P.M. weekday peak hour existing traffic volumes within the site vicinity.
- A.M. weekday peak-hour total traffic volumes.
- P.M. weekday peak-hour total traffic volumes.
- Existing average daily traffic within the site vicinity.
- Projected average daily traffic within the site vicinity.

- Should the peak hour trip generation rate not occur on a weekday, a weekend peak hour must be provided, i.e., restaurant, shopping center, church, and other land uses.

All maps of traffic volumes shall show both entering and exiting traffic at the proposed access points, as well as all turning movement volumes and through traffic at critical intersections. Total traffic refers to the background traffic plus site-generated traffic. Projected volumes are those expected at CMAP latest planning year projections.

Capacity Analyses: Capacity analyses shall be conducted at proposed access points and impacted intersections. These analyses shall follow the techniques described in the most recent edition of the Highway Capacity Manual. Analyses of projected conditions shall include the effects of any committed developments within the influence area. In designing an access facility or operation of impacted intersections, consideration must be paid to the existing and projected levels of service and the adequacy of storage for projected queue lengths.

Conclusions and Recommendations: A clear, concise description of the findings shall be presented and shall include all improvements for access, intersections, and the area road network.

Roadway widening improvements: All improved roadway shall have lane widths of 12 feet. At improvements of intersections with existing lane widths less than 12 feet, the improvement will include the widening of all lanes to 12-feet, unless otherwise approved by the Village Engineer. All turn lanes recommended in the Traffic impact Study must be constructed. However, other turn lane improvements may be required to be constructed as directed by the Village Engineer.

19.24.100 STREET LIGHTING

General

All developments shall provide street lighting facilities for the illumination of all roadways, which lie in or border the development. Street lighting shall be in conformance with these Mundelein Construction Design Policies and the Mundelein Construction Details. It shall be the responsibility of the developer or subdivider to pay the installation cost of all such lighting.

Prior to installation of any street lighting system, the following submittals are required for review and approval by the Village:

Layout of proposed street lighting system showing pole locations, right-of-way and any easements, cable/conduit routing, controller location, mast arm orientation, mast arm length, and source of power.

Manufacturer's information on poles, luminaries, mast arms, cable, conduit, controller, and appurtenances.

Streetlight Locations

Streetlights shall be spaced at a distance not to exceed two hundred feet (200') from one another for mid-block locations.

One street light assembly shall be located at every intersection. At "T" intersections, the light shall be provided on the centerline extended from the terminating street.

A street light assembly shall be located at curves as directed by the Village Engineer.

One street light assembly shall be located at the end of every cul-de-sac.

Streetlights shall be placed three feet (3') from back of curb.

Streetlights shall be no closer than six feet (6') to any driveway.

19.24.110 APPENDIX A FIRE FLOWS

Uniform File Code, Appendix III-A - Minimum Required Fire Flow and Flow Duration for Buildings

APPENDIX III-A 1997 UNIFORM FIRE CODE

TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

Type I-F.R. (I-F.R.) ¹	Type II One-HR. III One-HR. ¹	FIRE AREA (square feet)			FIRE FLOW (gallons per minute) ² × 3.785 for L/min.	FLOW DURATION (hours)
		× 0.0929 for m ²				
		Type IV-H.T. V-One-HR. ¹	Type II-N III-N ¹	Type V-N ¹		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	2
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	3
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	4
"	"	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
"	"	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
"	"	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
"	"	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
"	"	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
"	"	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
"	"	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
"	"	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

¹Types of construction are based upon the Building Code.
²Measured at 20 psi (137.9 kPa). See Appendix III-A, Section 2.