Committee of the Whole
Agenda Cover Memorandum

Meeting Date: October 26, 2009

Item Title: Land grades for residential properties

Action Requested:

- ☐ Approval
- ☒ For discussion
- ☐ Feedback requested
- ☐ For your information

Staff Contact: Carrie Davis, Director of CP&D
Phone Number: 847 / 318-5296
E-mail Address: cdavis@parkridge.us

Background:
Alderman Robert Ryan requested that staff provide the Committee of the Whole with information on existing policies and/or ordinances regarding grading for residential construction.

The Building Division is responsible for processing and reviewing all building permits for residential construction projects. Applicants are required to submit information regarding land grades for permit applications for new construction, additions and most accessory structures. The Division will review the following information to determine what, if any, change is proposed to the existing grades of a property. The Division uses both the International Residential Code (IRC) and the City's Building Code, contained in Article 15, Chaprter 8 of the Municipal Code, for plan reviews. The IRC is a universally accepted building code used by most communities throughout the country. The City automatically adopts the latest version of the IRC when it is published. The Building Code is used as a supplement to the IRC and contains specific building requirements unique to Park Ridge.

The following is a step-by-step procedure to review plans:

1. Review a topographic survey depicting the existing and proposed land grades. Section 15-8-2 on Drainage (attached) requires the Building Official to review grades to determine if an alteration will unreasonably divert water to an abutting or nearby property. Review of a topographic survey, from a licensed surveyor, is the most effective way to make this determination.

2. Ensure that the principal residential structure has a top of foundation that is higher than the public sidewalk at the front of the property. The Division relies on two sections of the IRC in reviewing plans (attached).

   - Section R404.1.6 for Height Above Finished Grade. This section requires that a minimum of four inches of exposed foundation wall extends above the finished grade. While no maximum height is established, Zoning Ordinance Section 7.3, Table 3 (attached) limits the maximum floor height at four feet above grade for all residential districts.

   - Section R401.3 for Drainage. Grades must slope a minimum of six inches within the first ten feet of a foundation wall. There is an exception for when this is not possible, for example, because of

a side lot line being less than 10 feet from a foundation wall. In these cases, a drain or swale is required.

Motion:
Provide direction to staff.

Budget Implications:

Does Action Require an Expenditure of Funds:	☐ Yes	☒ No
If Yes, Total Cost:		
If Yes, is this a Budgeted Item:	☐ Yes	☐ No

Attachments:
- Municipal Code Section 15-8-2 on Drainage
- International Residential Code Sections R404.1.6 and R401.3
- Zoning Ordinance Section 7.3, Table 3

- The Public sidewalk adjacent to the lot.
- Curb and flow line on both sides of the lot.
- Adjacent buildings and garage foundations and midpoint grades.
- Centerline of roadway at center of property frontage.
- Existing one (1) foot contours within lot and extended a minimum of 10' from perimeter to adjacent property.
- Proposed elevations to be shown (in bold or indicate with a "box"):
- Top of the proposed foundations for house (show all multilevel elevations) and detached garage.
- Side yard as well as midpoint grade elevations.
- Arrows indicating the proposed direction of storm water drainage (existing and proposed)
- Side yard summits.
- Phasing of Drainage Work.
- Location of the required area basin with plumbing details how the basin will be connected to the sewer with a minimum of a two-inch reducer inlet.
- For commercial or institutional plans provide detailed detention calculations in accordance with the Storm Water Management Ordinance, Article 11 Chapter 3 of the Park Ridge Municipal Code.
- Phasing of Drainage Work.

C. Proposed elevations or finished grade - that is the top of sod or seed, and the finished dirt grade shall be 2" below top of sod.

(Ord. 2005-46, 8/15/05, S24)

15-8-2 DRAINAGE

The Building Official shall not approve an alteration in the land grade if, in his opinion or the opinion of the City Engineer, the proposed alteration will cause water to be unreasonably diverted to any abutting or nearby property or alter the existing or natural drainage of the area.

(Ord 2005-46, 8/15/05, S24)

15-8-3 AREA DRAIN

All new single-family homes and additions to homes on lots in neighborhoods where the Building Official has determined that poor drainage causes ponding must install an area drain of a size and design and in a location and manner approved by the Building Official. Unless otherwise approved, the drain shall be located in the rear yard. The area drain shall be properly connected to the sanitary sewer, include a reducer inlet and must have a clean out in every 100 feet of horizontal pipe length. The clean out shall not be located on City property.

15-8-4 STORM WATER MANAGEMENT

All commercial and institutional property shall provide storm water management in accordance with Article 11 Chapter 3 of the Park Ridge Municipal Code.

bonded into the load-bearing masonry wall in accordance with Section R608.1.1 or Section R608.1.1.2.

4. The maximum height of a 4-inch (102 mm) load-bearing masonry foundation wall supporting wood-frame walls and floors shall not be more than 4 feet (1219 mm).
5. Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.5(1), or as specified by engineered design accepted by the *building official*.
6. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry or 12 inches (305 mm) for hollow masonry.
7. In Seismic Design Categories D_0, D_1 and D_2, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No.9 gage wires spaced not less than 6 inches (152 mm) or one $^1/_4$ inch (6.4 mm) diameter wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.

R404.1.6 Height above finished grade. Concrete and masonry foundation walls shall extend above the finished *grade* adjacent to the foundation at all points a minimum of 4 inches (102 mm) where masonry veneer is used and a minimum of 6 inches (152 mm) elsewhere.

R404.1.7 Backfill placement. Backfill shall not be placed against the wall until the wall has sufficient strength and has been anchored to the floor above, or has been sufficiently braced to prevent damage by the backfill.

Exception: Bracing is not required for walls supporting less than 4 feet (1219 mm) of unbalanced backfill.

R404.1.8 Rubble stone masonry. Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m), and shall not be constructed in Seismic Design Categories D_0, D_1, D_2 or townhouses in Seismic Design Category C, as established in Figure R301.2(2).

R404.2 Wood foundation walls. Wood foundation walls shall be constructed in accordance with the provisions of Sections R404.2.1 through R404.2.6 and with the details shown in Figures R403.1(2) and R403.1(3).

R404.2.1 Identification. All load-bearing lumber shall be identified by the grade *mark* of a lumber grading or inspection agency which has been *approved* by an accreditation body that complies with DOC PS 20. In lieu of a grade *mark*, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted. Wood structural panels shall conform to DOC PS 1 or DOC PS 2 and shall be identified by a grade *mark* or certificate of inspection issued by an *approved agency*.

R404.2.2 Stud size. The studs used in foundation walls shall be 2-inch by 6-inch (51 mm by 152 mm) members. When spaced 16 inches (406 mm) on center, a wood species with an F_b value of not less than 1,250 pounds per square inch (8619 kPa) as listed in AF&PA/NDS shall be used. When spaced 12 inches (305 mm) on center, an F_b of not less than 875 psi (6033 kPa) shall be required.

R404.2.3 Height of backfill. For wood foundations that are not designed and installed in accordance with AF&PA PWF, the height of backfill against a foundation wall shall not exceed 4 feet (1219 mm). When the height of fill is more than 12 inches (305 mm) above the interior *grade* of a crawl space or floor of a *basement*, the thickness of the plywood sheathing shall meet the requirements of Table R404.2.3.

R404.2.4 Backfilling. Wood foundation walls shall not be backfilled until the *basement* floor and first floor have been constructed or the walls have been braced. For crawl space construction, backfill or bracing shall be installed on the interior of the walls prior to placing backfill on the exterior.

R404.2.5 Drainage and dampproofing. Wood foundation basements shall be drained and dampproofed in accordance with Sections R405 and R406, respectively.

R404.2.6 Fastening. Wood structural panel foundation wall sheathing shall be attached to framing in accordance with Table R602.3(1) and Section R402.1.1.

R404.3 Wood sill plates. Wood sill plates shall be a minimum of 2-inch by 4-inch (51 mm by 102 mm) nominal lumber. Sill plate anchorage shall be in accordance with Sections R403.1.6 and R602.11.

R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of 24 inches (610 mm) of unbalanced fill shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning.

404.5 Precast concrete foundation walls.

R404.5.1 Design. Precast concrete foundation walls shall be designed in accordance with accepted engineering practice. The design and manufacture of precast concrete foundation wall panels shall comply with the materials requirements of Section R402.3 or ACI 318. The panel design drawings shall be prepared by a registered design professional where required by the statutes of the *jurisdiction* in which the project is to be constructed in accordance with Section R106.1.

CHAPTER 4
FOUNDATIONS

SECTION R401
GENERAL

R401.1 Application. The provisions of this chapter shall control the design and construction of the foundation and foundation spaces for all buildings. In addition to the provisions of this chapter, the design and construction of foundations in areas prone to flooding as established by Table R301.2(1) shall meet the provisions of Section R322. Wood foundations shall be designed and installed in accordance with AF&PA PWF.

Exception: The provisions of this chapter shall be permitted to be used for wood foundations only in the following situations:

1. In buildings that have no more than two floors and a roof.
2. When interior *basement* and foundation walls are constructed at intervals not exceeding 50 feet (15 240 mm).

Wood foundations in Seismic Design Category D_0, D_1 or D_2 shall be designed in accordance with accepted engineering practice.

R401.2 Requirements. Foundation construction shall be capable of accommodating all loads according to Section R301 and of transmitting the resulting loads to the supporting soil. Fill soils that support footings and foundations shall be designed, installed and tested in accordance with accepted engineering practice. Gravel fill used as footings for wood and precast concrete foundations shall comply with Section R403.

R401.3 Drainage. Surface drainage shall be diverted to a storm sewer conveyance or other *approved* point of collection that does not create a hazard. *Lots* shall be graded to drain surface water away from foundation walls. The *grade* shall fall a minimum of 6 inches (152 mm)within the first 10 feet (3048 mm).

Exception: Where *lot lines*, walls, slopes or other physical barriers prohibit 6 inches (152 mm) of fall within 10 feet (3048 mm), drains or swales shall be constructed to ensure drainage away from the structure. Impervious surfaces within 10 feet (3048 mm) of the building foundation shall be sloped a minimum of 2 percent away from the building.

R401.4 Soil tests. Where quantifiable data created by accepted soil science methodologies indicate expansive, compressible, shifting or other questionable soil characteristics are likely to be present, the *building official* shall determine whether to require a soil test to determine the soil's characteristics at a particular location. This test shall be done by an *approved agency* using an *approved* method.

R401.4.1 Geotechnical evaluation. In lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1 shall be assumed.

TABLE R401.4.1
PRESUMPTIVE LOAD-BEARING VALUES OF FOUNDATION MATERIALS[a]

CLASS OF MATERIAL	LOAD-BEARING PRESSURE (pounds per square foot)
Crystalline bedrock	12,000
Sedimentary and foliated rock	4,000
Sandy gravel and/or gravel (GW and GP)	3,000
Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000
Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500[b]

For SI: 1 pound per square foot = 0.0479 kPa.

a. When soil tests are required by Section R401.4, the allowable bearing capacities of the soil shall be part of the recommendations.

b. Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.

R401.4.2 Compressible or shifting soil. Instead of a complete geotechnical evaluation, when top or subsoils are compressible or shifting, they shall be removed to a depth and width sufficient to assure stable moisture content in each active zone and shall not be used as fill or stabilized within each active zone by chemical, dewatering or presaturation.

SECTION R402
MATERIALS

R402.1 Wood foundations. Wood foundation systems shall be designed and installed in accordance with the provisions of this code.

R402.1.1 Fasteners. Fasteners used below *grade* to attach plywood to the exterior side of exterior *basement* or crawlspace wall studs, or fasteners used in knee wall construction, shall be of Type 304 or 316 stainless steel. Fasteners used above *grade* to attach plywood and all lumber-to-lumber fasteners except those used in knee wall construction shall be of Type 304 or 316 stainless steel, silicon bronze, copper, hot-dipped galvanized (zinc coated) steel nails, or hot-tumbled galvanized (zinc coated) steel nails. Electrogalvanized steel nails and galvanized (zinc coated) steel staples shall not be permitted.

R402.1.2 Wood treatment. All lumber and plywood shall be pressure-preservative treated and dried after treatment in accordance with AWPA U1 (Commodity Specification A, Use Category 4B and Section 5.2), and shall bear the *label* of an accredited agency. Where lumber and/or plywood is

Zoning Ordinance

7.3 YARD AND BULK REGULATIONS

Table 3: Residential Districts Yard and Bulk Regulations establishes yard and bulk regulations for the residential districts.

CITY OF PARK RIDGE, ILLINOIS TABLE 3: RESIDENTIAL DISTRICTS YARD AND BULK REGULATIONS					
	DISTRICTS				
BULK REGULATION	R-1	R-2	R-3	R-4	R-5
MINIMUM LOT AREA	10,000sf Special Uses[3]: 20,000sf	6,500sf Special Uses[3]: 20,000sf	6,500sf Special Uses[3]: 20,000sf	SF & 2F: 6,500sf Townhouse: 3,000sf/unit MF: 1,800sf/unit or 9,000sf, whichever is greater Special Uses[3]: 20,000sf	SF & 2F: 6,500sf Townhouse: 2,200sf/unit MF: 1,500sf/unit or 6,500sf, whichever is greater Special Uses[3]: 20,000sf
MINIMUM LOT WIDTH	70 ft Special Uses[3]: 100 ft	50 ft Special Uses[3]: 100 ft	50 ft Special Uses[3]: 100 ft	50 ft Special Uses[3]: 100 ft	50 ft Special Uses[3]: 100 ft
MAXIMUM PRINCIPAL BUILDING HEIGHT	35 ft or 2½ stories, whichever is less	35 ft or 2½ stories, whichever is less	35 ft or 2½ stories, whichever is less	SF, 2F & Townhouse: 35 ft or 2½ stories, whichever is less MF: 40 ft	SF, 2F & Townhouse: 35 ft or 2½ stories, whichever is less MF: 45 ft
MAXIMUM HEIGHT OF FIRST FLOOR ELEVATION	4 ft from grade	4 ft from grade	4 ft from grade	4 ft from grade	4 ft from grade
MAXIMUM LOT COVERAGE	35%	35%	35%	50%	60%
MINIMUM OPEN SPACE	45% of zoning lot 50% of required front yard	40% of zoning lot 50% of required front yard	30% of zoning lot 50% of required front yard	30% of zoning lot; 40% of minimum open space shall be usable open space	30% of zoning lot; 40% of minimum open space shall be usable open space
MAXIMUM FLOOR AREA RATIO (FAR)	0.45 + 0.03 FAR Bonus, when applicable (See Section 7.5 below)	0.45 + 0.03 FAR Bonus, when applicable (See Section 7.5 below)	SF: 0.45 2F: 0.50	SF: 0.45 2F: 0.50	SF: 0.45 2F: 0.50