

CITY OF ROCHESTER HILLS
ENGINEERING DESIGN STANDARDS

CHAPTER 5

Grading

A. Requirements for Master Grading Plans

A Master Grading Plan is required for all developments. Master grading plans shall accompany the set of engineering construction plans and shall include the following:

1. Benchmark locations, descriptions and elevations (USGS) to be used for the development.
2. The minimum scale for grading plans is one-inch (1") = fifty feet (50').
3. The grades of existing adjacent houses, buildings, drainage structures and streets shall be shown. The actual surveyed grades of existing adjacent ground and yards shall be shown **as necessary to clearly define off-site drainage patterns** ~~on a 25-foot grid pattern~~ for 50 one-hundred feet (100') from the property line. The drainage pattern of all adjacent existing land shall be indicated. All off-site drainage flowing onto the site shall be clearly labeled and identified.
4. Meet existing ground at the property boundaries. Construct an intercepting swale to prevent drainage from development improvements onto adjacent property.
5. Grading plans shall correspond with proposed landscape, tree protection and soil erosion requirements. Any revisions in the grading plan may require Planning Department approval if it directly or indirectly ~~effects~~ **affects** the approved landscape or tree protection plans.
6. The grading plan shall be designed to ensure that if a failure occurs in the storm system, water will drain away in overland swales without flooding ~~houses~~ **structures**.
7. Show proposed building finish floor grade and top of curb grade at the center of each lot to ~~hundredths~~ **tenths** of a foot. **Also include grades at the mid-point of the building, at each lot corner, and at the mid-points on lot lines.** Place house grades within the plan view of the typical ~~house~~ **building** to be built in this development. Front **yard** setbacks shall be drawn to scale.
8. The finish grade shall be compatible with the grades of surrounding buildings and yards.
9. Show ~~the~~ **grade changes at** proposed sidewalks ~~grades at lot lines, center of~~ **and at** driveway crossings. ~~and at 25-foot intervals to hundredths of a foot.~~
10. Rear yard storm drainage is required in all residential developments where adjacent lots drain to the rear. ~~20-foot~~ **Twenty foot (20')** easements shall be established for the required storm drains.

11. Indicate rear yard catch basins. Show the proposed rim elevation to hundredths of a foot. Catch basins are required to be at a lot corner and the catch basin rim grade shall be the only grade shown at that corner.
12. Indicate perforated plastic rear yard underdrains and tees for sump pumps where they are called for in the storm sewer plans. Use different symbols for plastic underdrains and concrete storm sewer on the plans.
13. All existing and proposed earth grades are to be in tenths (10ths) of a foot.
14. Rear yard swales shall be, in general, no longer than 400 feet before being intercepted by a catch basin and shall have a minimum grade of one percent (1%).
15. Rear yard storm drain piping shall be concrete, at twelve inches (12") minimum diameter.
- ~~1. Show both existing and proposed ground grades at lot corners around the perimeter boundaries. The proposed grades should be equal to or lower than existing ground grades.~~
16. Show the proposed side yard swale elevation between all buildings. This elevation must be a minimum of one-half feet (0.5') below the lower adjacent building grade. The side yard swale must have a minimum slope of one percent (1%) to the front and rear.
17. Where topography prevents rear yard drainage from being practical, rear to front or rear to side drainage may be allowed. The following swale elevations must be shown.
 - a. The high point of the swale(s), located generally behind the **house building**, a minimum of fifteen feet (15') from the **house building** and one **feet foot (1')** below the building brick ledge grade.
 - b. The side swale elevation located even with the front and back of the **house building**.
18. The general direction of flow of the rear yard drainage and all swales must be indicated with arrows. Swales need not be otherwise labeled. Arrows need not be drawn for front yards with standard building to street drainage.
19. Additional grades shall be shown under Special Conditions as required.
20. The lot number, address or Tax ID (Sidwell) shall be shown for each lot.
21. All easements, drawn to scale and properly labeled, shall be shown, including natural feature set backs.
22. Master grading plan must include a note stating that the site must be balanced and certified by a licensed professional surveyor within one foot (1') of finished grade prior to underground utility installation.

B. Requirements for Individual Grading Plans

The following general grading requirements shall be applied in the design of the individual site grading plans (plot plan or single lots):

1. Drainage shall be adequately discharged off-site, to either the street or a dedicated storm drain.
2. No upstream drainage shall be restricted.
3. The developed portion of the site in general shall drain without standing water, unless specifically designed for retention and/or detention.
4. Elevations representing the brick ledge, finished grade and the first floor grade shall be indicated. Basement **and lowest opening** grades shall be shown ~~for walkouts~~.
5. Lots with rear-to-front drainage shall have swales shown around each building or structure. Elevations of swales shall be called out at high points and low points.
6. No berms shall be placed over any ~~underground~~ public water main, sanitary sewer, or storm drain, or within the designated easements for such facilities.
7. Grading plans shall be prepared by a licensed professional engineer or surveyor, signed and sealed, and shall conform with the following minimum requirements, with the final sufficiency of such plan to be determined by the **Department of Public Services**:
 - a. A scale of not less than one inch (1") equals fifty feet (50'). Scales of one-inch (1") equals twenty feet (20') are preferred.
 - b. Date, north arrow and scale must be called out.
 - c. The dimensions of all property lines, showing the relationship of the subject property to abutting properties.
 - d. All required zoning setbacks shown and property labeled.
 - e. All existing and proposed ground grades in tenths (10ths) of a foot.
 - f. General direction of the rear yard drainage and swales indicated with arrows.
 - g. Additional grades shown under special conditions as required by the **Department of Public Services**.
 - h. The location of all utility leads (water, sanitary, sump pump).
8. Proposed driveways shall be shown with grades at the **house** and street called out. Slope in percent (%) shall be shown, **maximum slope of eight percent (8%) along roads with posted speed limits of 40 MPH or greater and a maximum slope of ten percent (10%) along roads with a posted speed limit of 35 MPH or less. ~~10% eight percent (8%) (talk to Mare Matich)~~, minimum slope of two percent (2%)**. Note: driveway slopes cannot exceed two percent (2%) through the portion of the driveway that is to be utilized for

existing and/or proposed pedestrian facilities, i.e., pathways and sidewalks, in order to meet American with Disabilities Act (ADA) requirements.

9. All public and private easements, drawn to scale and properly labeled, shall be shown, including natural features setbacks.

C. Retaining Walls

1. Retaining walls should be used when adequate grading cannot be accomplished.
2. Retaining walls exceeding forty-two inches (42") in height should include protective fencing on top.
3. Retaining walls exceeding forty-eight inches (48") in height shall be designed by a licensed professional engineer. Design calculations shall be submitted with the construction plans.