

Chapter 6. EARTHWORK & EROSION CONTROL

6.1 Introduction

This chapter contains minimum criteria to be met on all earthwork and erosion control design in the City, both by private land developers and by the City through their Capital Projects Program. As a planning element, a (Geotechnical) Soils Investigation Report shall be completed for all site grading, utility, or pavement projects. Refer to **Chapter 5- Design Reports Requirements** for the requirements of the Geotechnical and Pavement Design Reports.

6.2 Soils Investigations

6.2.1 General

General Requirements

Three categories of testing and reports are required for all projects requiring right-of-way grading, utilities, and paving; geotechnical report, final pavement design report, and extra testing (e.g., imported fill).

Geotechnical Report

This report evaluates the characteristics of the soils and the general issues of groundwater, soil stability, and swell potential. If groundwater is found within certain parameters, a subsurface water investigation is required. A geotechnical report is required for street, utilities and related improvements within the Right of Way, public easements, or slope easements. This report is required as part of the preliminary plat submittal (refer to **Chapter 5- Design Report Requirements**).

Final Pavement Design Report

This report is required for all projects with roadway improvements. The soil investigation associated with this report will occur after grading for roadways and utilities is complete. This report must be submitted and approved prior to any nonstructural concrete or paving installation (refer to **Chapter 5 - Design Report Requirements**).

Extra Testing

If fill material is required for the project, this material shall also be tested before placement.

Supervision by Engineer

All sampling and testing of soils shall be performed under the direct supervision of a Professional Engineer who must sign and stamp the report.

6.3 Earthwork & Grading

6.3.1 Design

Prior to the issuance of Right of Way permits and/or grading permits, the Designer shall complete the following plans:

- Grading Plans with one-foot (1') contours for topographic information. The plans shall provide existing topographical information as well as designed changes to the topographic information. All plans should show contours at least one hundred feet (100') beyond limits of the project.
- Drainage Improvements shall be designed to address any rainfall and drainage across the project.
- Geotechnical Report. Refer to **Chapter 5- Design Report Requirements** for the requirements of this report.

- Erosion Control Design. Erosion control shall be designed for the area that is being proposed for excavation, grading, cuts, fills, clearing and grubbing.
- Stormwater Management Plan (SWMP) Submittal meeting the requirements of Colorado Department of Public Health and Environment. Refer to www.northglenn.org/stormwater or www.colorado.gov/pacific/cdphe/news/water-quality-permits, find Construction sector.
- All design elements for grading shall follow the requirements of this chapter as well as the requirements of Mile High Flood District (MHFD) Standards.

6.3.2 Design Requirements

- All earthwork operations shall be executed in a manner which will minimize dust, noise, excessive accumulation of debris, danger to the public and interference with other construction.
- Positive drainage and adequate erosion control shall be provided at all times during the earthwork operations.
- Earthwork operations shall be executed to provide compaction to a minimum 85-percent Standard Proctor density at + three percent (3%) of optimum moisture in areas to be eventually turfed or planted. Compaction to minimum 95 percent Standard Proctor density at + two percent (2%) of optimum moisture under all walks, trails, streets, structures, and other site improvements.
- Testing, if required by the City to demonstrate compliance with this specification, shall be performed per AASHTO T-180 by a Professional Engineer registered in the State of Colorado and practicing in the field of soils mechanics. All costs for such testing shall be paid by the Developer/Contractor. Refer to the applicable section in these STANDARDS AND SPECIFICATIONS for compaction requirements within the public Right of Way.
- Upon completion of earthwork operations, the Developer/Contractor shall leave the site and soil clean to allow for proper installation of irrigation, plantings, and related site improvements.
- Completed grades shall be smoothly and uniformly sloped, properly compacted and shall provide drainage away from site improvements. All banks or slopes constructed shall be maintained in a stable condition by approved methods to prevent slips, washouts, or erosion.
- No area to be seeded or sodded shall be steeper than a 4:1 maximum slope (4 horizontal: 1 vertical), nor flatter than a 2-percent minimum slope. Final grades shall conform to the final drainage study and grading plans.

6.4 Erosion & Sediment Control Plans

6.4.1 Review and Approval

A person may not clear or grade land without first preparing an erosion and sediment control plan which has been approved by the City prior to the issuance of any required Grading Permit.

The Applicant shall submit an erosion and sediment control plan and any supporting computations to the City for review and approval. The erosion and sediment control plan shall contain sufficient information, drawings and notes to describe how soil erosion and off-site sedimentation will be minimized. The City shall review the plan to determine compliance with these STANDARDS AND SPECIFICATIONS, Mile High Flood District Storm Drainage Criteria Manual, Volumes 1 through 3 and the Municipal Code prior to approval. The plan shall serve as a basis for all subsequent grading and stabilization.

The City may impose such conditions thereto as may be deemed necessary to ensure compliance with the provisions of these STANDARDS AND SPECIFICATIONS, Mile High Flood District Storm Drainage Criteria Manual, Volumes 1 through 3 and the Municipal Code for the preservation of public health and safety.

Approved plans may remain valid for one year from the date of acceptance unless renewed by the City. Approved plans will become an exhibit to the City's Grading Permit.

6.4.2 Modifications to Approved Erosion and Sediment Control Plans

When inspection of the site indicates the approved erosion and sediment control plan needs modification, the modification shall be made in compliance with the erosion and sediment control criteria contained in these STANDARDS AND SPECIFICATIONS, the Mile High Flood District Storm Drainage Criteria Manual, Volumes 1 through 3 and Municipal Code.

The permittee shall submit requests for major modifications to approved erosion and sediment control plans, such as the addition or deletion of a sediment basin, to the City to be processed appropriately. This processing includes modifications due to plan inadequacies at controlling erosion and sediment as revealed through inspection.

The City may approve minor modifications to approved erosion and sediment control plans in the field if conditions so merit.

6.4.3 Grading & Erosion Control Notes

The following minimum grading and erosion control notes shall be stated on, as well as incorporated into the grading and erosion control plan:

Erosion Control Notes

All temporary erosion control facilities and all permanent facilities intended to control erosion of any earth disturbance operation shall be installed before any earth disturbance operations take place.

Any earth disturbance shall be conducted in such manner so as to effectively reduce accelerated soil erosion and resulting sedimentation and should not exceed the erosion expected to occur for the site in its totally undeveloped state.

All persons engaged in earth disturbances shall design, implement, and maintain acceptable soil erosion and sedimentation control measures, in conformance with the erosion control technical standards adopted by the City.

All earth disturbances shall be designed, constructed, and completed in such a manner so that the exposed area of any disturbed land shall be limited to the shortest possible period of time.

Sediment caused by accelerated soil erosion shall be removed from runoff water before it leaves the site of the earth disturbance.

Any temporary or permanent facility designed and constructed for the conveyance of water around, through or from the earth disturbance area shall be designed to limit the water flow to a non-erosive velocity.

Temporary soil erosion control facilities shall be removed, and earth disturbance areas graded and stabilized with permanent soil erosion control measures pursuant to standards and specifications prescribed in accordance with the provisions of the "Erosion and Sediment Control for Construction Activities" and in accordance with the permanent erosion control features shown on the soil stabilization plan approved by the City.



Permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within fourteen (14) calendar days after final grading or the earth disturbance has been completed. When it is not possible to permanently stabilize a disturbed area after an earth disturbance has been completed or where significant earth disturbance activity ceases, temporary soil erosion control measures shall be implemented within fourteen (14) calendar days. All temporary soil erosion control measures shall be maintained until permanent soil erosion measures are implemented.

Grading Permits and Construction Observation

Before construction begins, the Applicant shall apply for a Grading Permit to the City of Northglenn. A permit may be issued if a grading plan and an erosion control plan have been previously submitted and accepted. A grading permit is required when the Developer/Contractor is performing grading on one of more acres.

The Engineering Division shall monitor all overlot grading and other earth disturbance activities for compliance with the Grading Permit. If the construction activities are not in compliance with the intent of the Erosion Control Plan, the Responsible Party shall be issued a stop-work order. Work will not be allowed to continue until the site is brought into compliance with the intent of the Erosion Control Plan.

Modification of Approved Plans

All proposed modifications of the accepted grading plan must be submitted along with all supporting materials to the Engineering Division. No work in connection with the proposed modifications shall be permitted without prior approval of the Engineering Division, approval for which may be issued if the Applicant can demonstrate that the modifications will provide soil erosion controls equivalent to or better than the originally approved soil disturbance plans.

Maintenance Requirements

Persons carrying out soil erosion and sediment control measures under this section, and all subsequent owners of property concerning which such measures have been taken, shall maintain all permanent erosion control measures, retaining wall, structures, plantings, and other protective devices. Should the Applicant or any subsequent property owners fail to adequately maintain the permanent erosion control facilities, retaining walls, structures, plantings, and other protective devices; the City reserves the authority, after properly notifying the owner of needed maintenance and the owner failing to respond to the City's demand for such maintenance, to enter affected property, provide needed maintenance and to charge the owner for the work performed by the City or its contractors.

Standard Erosion Control Details

Erosion control measures shall comply with the Standard Drawings included in these STANDARDS AND SPECIFICATIONS, however these may be revised or updated as necessary in compliance with the latest requirements of Mile High Flood District (MHFD) as applicable.

For projects having the potential to cause water pollution, the Storm Water Management Plan (SWMP) must be available on site and at all times and must be implemented year-round throughout the duration of the construction project.

Storm Water Management Plan (SWMP). The Designer should refer to the CDPHE SWMP development guidance materials.

Dust control measures shall be implemented at all times during the construction period until no longer required. Contractor shall pay for the removal of all silt from the storm drain systems and the inspection thereof.

6.5 Erosion Control

The primary goal of all erosion control systems is to prevent unacceptable erosion and maintain water quality at acceptable levels. This shall be accomplished by analyzing pertinent environmental factors and applying technical procedures which result in a workable plan.

There are two major elements in developing an erosion and sedimentation control plan. The first is an investigation and analysis of the natural characteristics of a site (such as soil type, steepness of slopes and available vegetation) that will help the Developer/Contractor anticipate where erosion problems might occur. Detailed information on soils, vegetation, topography, geologic and hydrologic conditions shall be obtained for the site. The second element is use of effective control measures. Attention shall be given to identify and evaluate problems that may cause serious erosion during and after construction. Runoff from the site, as well as runoff from the watershed above, shall be controlled and discharged safely. Measures shall be taken to prevent erosion and sediment deposition on downstream properties.

6.5.1 Limitations

No person shall clear or grade land without implementing soil erosion and sediment controls in accordance with the requirements of these STANDARDS AND SPECIFICATIONS, Mile High Flood District publication known as the Urban Storm Drainage Criteria Manual, Volumes 1 through 3 and Municipal Code.