

CLEARING & GRADING

Modern site development techniques result in compacted soils, little top soil, and few micro-organisms. Native soils provide water storage and infiltration, while engineered soils provide little, if any water storage and infiltration. Native vegetation and soils can be protected and integrated into the project, provided cuts and fills do not impact the root zones of the vegetated areas.



Purpose of this Brochure

This brochure discusses the effects that clearing and grading have on a site's ability to store and infiltrate storm flows.

HABITAT FRIENDLY DEVELOPMENT PRACTICES

BROCHURE SERIES:

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Habitat Friendly Development Practices

...CLEARING & GRADING

City of Beaverton

Clearing & Grading Assessment

Possibly, the greatest low impact development (LID) technique is not to clear or grade a site, where possible. In order to accomplish this goal, it is important to assess the site thoroughly to verify limitations inherent to the site.

The following are tools to consider in determining how to minimize clearing and grading impacts on a development site:

- analyze site conditions to minimize alterations to contours, topography, native vegetation and soils
- inventory and protect a diversity of native trees as part of the site design and construction processes
- reduce unnecessary mass grading and soil compaction, wherever possible
- stockpile topsoil during construction and replace topsoil after construction
- properly fence vegetated areas for preservation prior to site development activities and fence topsoil stock piles, keeping fencing properly in place throughout the construction process
- install signs on the fenced areas to remind construction personnel to eliminate activity in these areas
- conduct pre-construction meetings with all construction personnel to communicate the importance of not disturbing fenced vegetated areas and soil stock piles
- design smaller building envelopes
- implement minimal foundation excavation techniques
- construct foundation designs that fit the building into the land rather than reshaping the land to fit the building
- deep-till and loosen soils compacted during site grading to restore their natural infiltration capacity for areas intended for stormwater management and infiltration or not required to have a structural capacity
- plant native vegetation in lieu of turf grass and non-native ornamental plants.

City of Beaverton Requirements

Engineering Design Manual and Standard Drawings

Section 155 Environmental Protection During Construction

City Code

Section 9.05 Site Development

Benefits of Reduced Clearing & Grading

Preservation and incorporation of existing natural features and systems into site design result in marketable site amenities and lower construction and infrastructure costs, including reduced:

- grading costs and time
- installation and maintenance of erosion control measures
- mitigation measures
- storage and/or removal of cut materials
- area used for stormwater management facilities

Best Management Practices for Land Grading

The following excerpts regarding Best Management Practices (BMPs) for land grading were developed by the Environmental Protection Agency (EPA), see:

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=32.



Soils exposed from land grading activities are very vulnerable to erosion

Description

Land grading involves reshaping the ground surface to planned grades as determined by an engineering survey, evaluation, and layout. Land grading provides more suitable topography for buildings, facilities, and other land uses and helps to control surface runoff, soil erosion, and sedimentation during and after construction.

Applicability

Land grading is applicable to sites with uneven or steep topography or easily erodible soils, because it stabilizes slopes and decreases runoff velocity. Grading activities should maintain existing drainage patterns as much as possible.

Siting and Design Considerations

Before grading activities begin, a construction site operator must make decisions regarding the steepness of cut-and-fill slopes and how the slopes will be

- Protected from runoff
- Stabilized
- Maintained

A low-impact development BMP that a site operator can incorporate into a grading plan is site fingerprinting, which involves clearing and grading only those areas necessary for building activities and equipment traffic. Maintaining undisturbed temporary or permanent buffer zones in the grading operation provides a low-cost sediment control measure that will help reduce runoff and offsite sedimentation. Let the lowest elevation of the site remain undisturbed to provide a protected stormwater outlet before storm drains or other construction outlets are installed.

Limitations

Improper grading practices that disrupt natural stormwater patterns might lead to poor drainage, high-runoff velocities, and increased peak flows during storm events. Clearing and grading the entire site without vegetated buffers promotes offsite transport of sediments and other pollutants. Design the grading plan with erosion and sediment control and stormwater management goals in mind; to ensure that the plan is implemented as intended, carefully supervise grading crews.

Maintenance Considerations

Check all graded areas and supporting erosion and sediment control practices periodically, especially after heavy rainfalls. Promptly remove all sediment from diversions or other stormwater conveyances, and if washouts or breaks occur, repair them immediately. To prevent small-scale eroded areas from becoming significant gullies, maintain them promptly.

Effectiveness

Land grading is an effective way to reduce steep slopes and stabilize highly erodible soils when properly implemented with stormwater management and erosion and sediment control practices. Land grading is not effective when drainage patterns are altered or when vegetated areas on the perimeter of the site are destroyed (USEPA, 2004).