PD-21: Earthwork Balance

1-5 points

Goal: Reduce the need for transport of earthen materials by balancing cut and fill quantities.

Sustainability Linkage

Balancing cut and fill quantities in a project supports the environmental and economic sustainability principles by reducing the environmental and economic costs associated with the transport of earthen materials.

Background and Scoring Requirements

Scoring Requirements

Requirement PD-21.1

3 points. Balance Cut and Fill Volumes within 10 Percent

Balance earthwork cut (excavation) and fill (embankment) volumes such that the percent difference between cut and fill is less than or equal to 10 percent of the average total volume of material moved. For purposes of this criterion, it is recommended that the owner use the following method and definitions, or equivalent, to compute cut and fill volumes. Include miscellaneous additional cut and fill such as outlet ditches and muck excavations, and account for moisture and density as well as shrink and swell. Note that for purposes of this criterion, all volumes are positive quantities.

One of the following scoring requirements may apply.

- **Requirement PD-21.1a**

  3 points. Balance Cut and Fill Volumes without Construction Banking

  Show that that design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet:

$$\frac{(A + C) - (B + D)}{\frac{1}{2}(A + C + B + D)} \times 100\% \leq 10\%$$

A = Volume of Cross Section Cut

B = Volume of Cross Section Fill C

= Volume of Miscellaneous Cut

D = Volume of Miscellaneous Fill

  Include the following materials in the calculations: (1) Soil stabilizer materials or other soil additives, (2) Removed topsoil materials, and (3) Unused cut or imported fill materials placed in stockpiles.

  Exclude the following materials from the calculations: (1) Mechanical stabilizers such as rock bolts and geotextile fabric materials, (2) Structural aggregate for base courses in pavements, foundations, or superstructures such as bridges, (3) Structural backfill and drain rock specifically intended for utility trenches and stormwater infrastructure, and (4) Rock (Stable Rock, defined by the Occupational Health and Safety

Administration) cuts sourced within the project boundary that are intended for use as structural aggregate within the project boundary.

OR

- **Requirement PD-21.1b**

  1 point. Balance Cut and Fill Volumes Using Construction Banking

  Show that the design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet the Requirement PD-21.1a only if construction banking is used and the following requirements are met:

  - Construction banking may be accomplished using adjacent projects or other phases of the same project.
  - Trucking distance from banking stockpiles to project limits must be less than 10 miles.
  - Banking stockpiles must be used and earthwork balanced within a period of 24 months.
  - All stockpiles must have a temporary erosion and sedimentation control (TESC) plan in place and appropriate measures must be installed. Maintenance for TESC methods must be accounted for in the project being evaluated or the adjacent project sharing earthwork banking and maintenance must be completed and documented.

- **Requirement PD-21.2**

  1 point. Earthwork Management Plan

  Establish, implement, and actively manage an Earthwork Management Plan for earthwork activities that focuses on reducing hauling, labor, and fuel costs

  - Positioning and stockpiling – plan how fill is moved around the site to decrease dump truck travel trips.
  - Actively manage available soil stockpiles with project earthwork needs.
  - Provide guidance on how to manage cut and fills, for example:
    - Balancing "cuts and fills" per construction stage so that traffic can be maintained on the existing pavement during construction.
    - Off-siting of construction staging areas in previously developed area to eliminate land disturbance outside of the constructed project limits.
    - No land use or staging outside of that required for the proposed project footprint.
    - Reuse of top soil onsite (non-hazardous only).

- **Requirement PD-21.3**

  1 point. Preserve or reuse topsoil or spoils.

  Show that the contract design requires the Contractor to preserve or reuse topsoil or spoils as noted in one or more of the practices below:

  - **Topsoil Preservation.** Topsoil depth is maintained or increased in planting areas, appropriate for the proposed plant community.
  - **Topsoil Preservation.** Design minimizes or eliminates the requirement for fertilizer nutrients.
  - **Reuse of Topsoil.** Allow the reuse of top soil removed for grading and reuse of this material on site as long as it is determined non-hazardous material. This can include the use of soil to create berms elsewhere within the corridor, thereby eliminating the need for trucking or disposal.
  - **Reuse Spoils within Project Corridor.** Utilize spoil material as fill as specified in plans and specifications within project limits or at locations specified in the plans.

Resources

None referenced.

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Grading plan, reporting total cut and fill quantities and total miscellaneous cut/fill.
2. Inspector or Contractor's actual construction earthwork volumes for the project, including actual cut and fill, volume of unused embankment materials, and volumes of imports to and exports from site.