CE431 Construction Contracting
Term Project: Detailed Cost Estimating
Ann Arbor Fire Station #6

EXCAVATION ESTIMATE

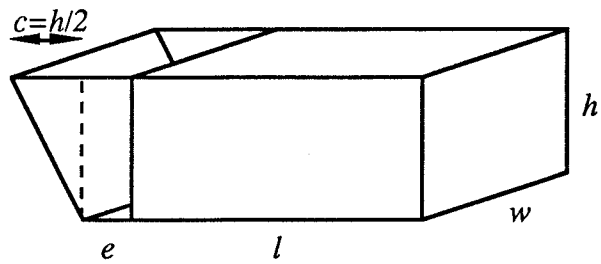
In general, a detailed excavation estimate includes:

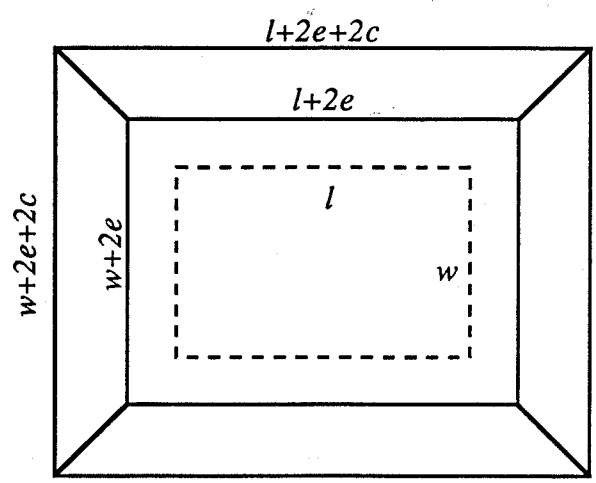
- Clearing the land of all previous building debris, trees, stumps, driveways, walks, etc. (unless specified otherwise)
- Stripping top soil (follow any instructions for saving it)
- Excavating to bottom of foundation as required on plans, including any excavation required outside the building limits to permit construction
- Stabilizing embankments—either laying it back or sheeting and shoring
- Dewatering as necessary—primarily groundwater
- Laying any sand and/or gravel bases for footings, slabs, sidewalks, and paving
- Backfilling and compacting earth around the building
- Placing topsoil and grading to final site contours
- Disposing of all excess soil, debris, etc., from site

Assignment

Prepare a detailed estimate for the excavation required for the Ann Arbor Fire Station No. 6 project:

- The sitework is described in Sitework: Division 2A, and enumerated in Scope of Work: Paragraph 2a.
- Your estimate will include only the following items in 2a, which are related to the building footprint:
  7) Excavating for all footings, foundations walls and concrete slabs.
  9) Backfill for foundations.
  12) Fill under ~~walks and~~ interior slabs on grade.
  13) Compaction of fill as required.
- Assume site is clear of any improvements.
- Assume there are no trees on the site, and that the topsoil has already been removed.
- Use existing site contour lines to estimate excavation volumes, and backfill to new contours.
- Work will not include Landscaping, Division 2B.
- Submit one estimate for your team.
- Arrange your estimate in the following segments:
  - Summary sheet
  - Estimate sheets. For each item, this will include quantity takeoff, any sketches or drawings, description of method(s), and costing. Use format described in class.
  - Labor hourly cost calculations.





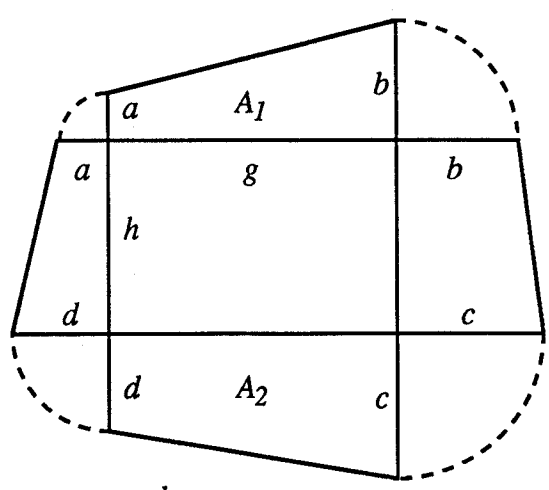
$$V \cong \frac{h}{2}[(w+2e+2c)(l+2e+2c)+(w+2e)(l+2e)] = \frac{h}{2}(A_b + A_t)$$

$$A_b = (w+2e)(l+2e)$$

$$A_t = (w+2e+2c)(l+2e+2c)$$

$$V = \frac{h}{3}(A_t + A_b + \sqrt{A_t A_b})$$

$e = 1ft$ min, to $3ft$ for $h = 12ft$



$$V = \frac{h}{2}(A_1 + A_2)$$

$$= \frac{h}{2}[(a+b)\frac{g}{2} + (c+d)\frac{g}{2}]$$

$$= \frac{gh}{4}(a+b+c+d)$$